

Panasonic

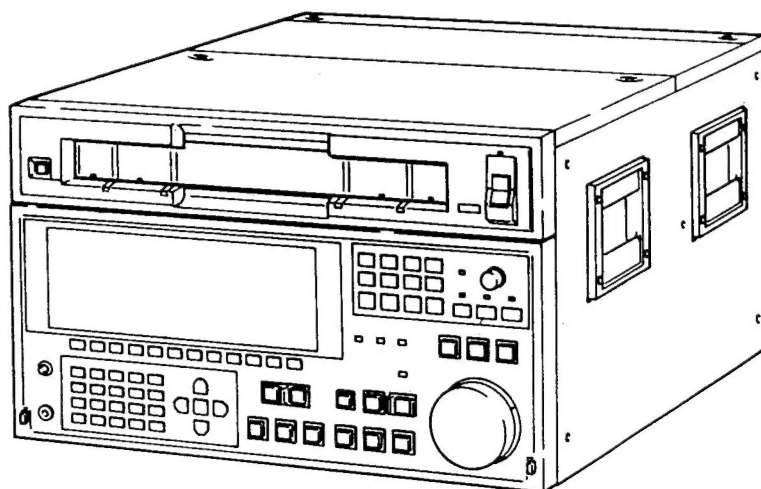
D-3 1/2" DIGITAL

STUDIO VTR

AJ-D350-P/E

NTSC/PAL

Operating Instructions & Service Manual V. 5-0



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Broadcast Systems

FILE NO. VSD9106M001-5

Service Manual

*Electrical
Adjustments*

Panasonic
Broadcast Systems

Electrical Adjustment

NTSC

RECOMMEND TEST AND SERVICE EQUIPMENT

PART No	NAME	REMARK
1910 or TSG170D	DIGITAL COMPOSITE SIGNAL GENERATOR	TEKTRONIX
1410	COMPOSITE SIGNAL GENERATOR	TEKTRONIX
2467B	400MHz OSCILLOSCOPE	TEKTRONIX
1750	SCH METER	TEKTRONIX
520A	VECTOR SCOPE	TEKTRONIX
	DIGITAL VOLT METER	
	FREQUENCY COUNTER	
	VTVM	FREQUENCY BAND WIDE 4Hz ~ 500KHz
	DIGITAL MULTI METER	
	DISTORTION METER	
HP8591A	SPECTRUM ANALYZER	HEWLETT PACKARD
	AUDIO ANALYZER (or RC OSCILLATOR)	
TYPE 5012	DIGITAL AUDIO SIGNAL GENERATOR	PRO-BEL

Note: (1) CF OUT modification is necessary for 1910.
Please contact with TEKTRONIX for this modification.
(2) 1910 digital video out is necessary to use cross cable tool.

How to read a table for adjustment

TEST	Test Points for scope and [Location on the Board]
MODE	Set VTR this mode
TAPE	Alignment Tape portion or work tape
M.EQ	Measurement Equipment
INPUT	Input the signal to VTR specified here
ADJ.	Adjustment portion and [Location on the Board]

1. AUDIO A/D D/A, VIDEO D/A (L1) BOARD [AUDIO SECTION]

1-1. A/D REFERENCE LEVEL ADJUSTMENT

TEST	TP302(CH1)[C2], TP305(CH2)[C3], TP312(CH3)[C5], TP315(CH4)[C7]
MODE	STOP
TAPE	
M.EQ	VTVM
INPUT	1kHz +4dBm Sinewave Signal to AUDIO IN (CH1 to CH4)
ADJ.	VR301(CH1)[B2], VR302(CH2)[B3], VR304(CH4)[B7]

4000 SERIES

<STEP 1>

MACHINE CONDITION

1. INPUT ATT SELECT SW+4dBm
(on the AUDIO IN/OUT Board)
2. OUTPUT ATT SELECT SW+4dBm
(on the AUDIO IN/OUT Board)
3. INPUT IMPEDANCE SW 600Ω
(on the AUDIO IN/OUT Board)

<STEP 2>

MENU CONDITION

AUDIO IN MENU

Select the AUDIO INPUT LEVEL to "UNITY"
(CH1 ~ CH4 : F1 ~ F4)

<STEP 3>

1. VTVM : LINE OUT (CH1)
LINE OUT (CH2)
LINE OUT (CH3)
LINE OUT (CH4)
2. Adjustment VR : VR301 (CH1)
VR302 (CH2)
VR303 (CH3)
VR304 (CH4)

SPECIFICATION:

VR301, VR302 : +4dBm ± 0.05dB
VR304, VR303

<STEP 4>

1. VTVM : TP301 (CH1)
TP302 (CH2)
TP303 (CH3)
TP304 (CH4)
2. Confirm that the Audio level is within the specification as shown.

SPECIFICATION : +9.30dBm ± 0.5dB

<STEP 5>

1. VTVM : TP303 (CH1)
TP306 (CH2)
TP313 (CH3)
TP316 (CH4)
2. Confirm that the Audio level is within the specification as shown.

SPECIFICATION : -9.7dBm ± 0.2dB

1-2. AUDIO OUTPUT LEVEL ADJUSTMENT

TEST	LINE OUB: (CH1),(CH2),(CH3),(CH4), (MONI LCH),(MONI RCH)
MODE	STOP
TAPE	
M.EQ	VTVM
INPUT	1kHz +4dBm Sinewave Signal to AUDIO IN
ADJ.	VR601(CH1)[F2], VR602(CH2)[G2], VR603(CH3)[I2], VR604(CH4)[J2], VR605(MONI LCH)[K2], VR606(MONI RCH)[M2]

<STEP 1>

MENU CONDITION

AUDIO IN MENU

Select the AUDIO INPUT
LEVEL to "OFF" : F7

<STEP 2>

1. VTVM : CH1 LINE OUT
CH2 LINE OUT
CH3 LINE OUT
CH4 LINE OUT
MONI LCH OUT
MONI RCH OUT
2. Adjustment VR : VR601 (CH1)
VR602 (CH2)
VR603 (CH3)
VR604 (CH4)
VR605 (MONI LCH)
VR606 (MONI RCH)

(SPECIFICATION)

Each CH Output Level : +4dBm ± 0.5dB

Note: If there is some noise at monitor out, please
adjust L601 ~ L602, L201.

1. AUDIO A/D D/A, VIDEO D/A (L1) BOARD [VIDEO SECTION]

MENU CONDITION

VIDEO IN MENU

Select the VIDEO INPUT F3 to "DIGITAL"

VIDEO OUT SET UP MENU

Select the VIDEO STANBY OFF to "EE2"

STANBY OFF

VIDEO : EE2

1-1. VIDEO OUTPUT LEVEL ADJUSTMENT (L1 : VIDEO D/A)

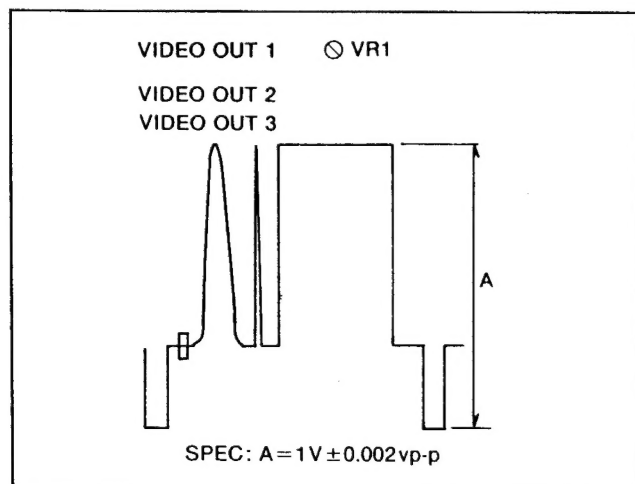
TEST	VIDEO 1 OUT, VIDEO 2 OUT, VIDEO 3 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	PULSE & BAR to DIGITAL IN
ADJ.	VR1 (D/A LEVEL)[A8]

<STEP 1>

- SCH METER : VIDEO 1 OUT
- Adjust VR1 so that the Video level "A" is $1V \pm 0.002V_{p-p}$ as shown in Figure.

<STEP 2>

- SCH METER : VIDEO 2 OUT
VIDEO 3 OUT
- Confirm that the Video level "A" is $1V \pm 0.002V_{p-p}$.



1-2. VIDEO OUTPUT FREQUENCY ADJUSTMENT (1) (L1 : VIDEO D/A)

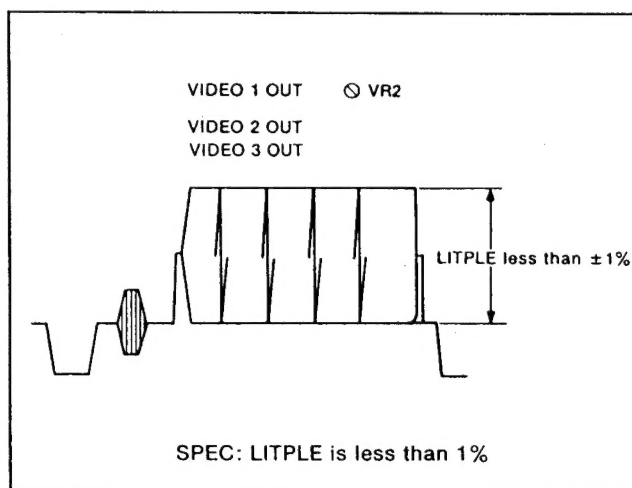
TEST	VIDEO 1 OUT, VIDEO 2 OUT, VIDEO 3 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL H SWEEP to DIGITAL IN
ADJ.	VR2 [L8]

<STEP 1>

- SCH METER : VIDEO 1 OUT
- Adjust VR2 so that the Frequency Response is flat as shown in Figure.

<STEP 2>

- SCH METER : VIDEO 2 OUT
VIDEO 3 OUT
- Confirm that the Frequency Response is flat as shown in Figure.



1-3. VIDEO OUTPUT FREQUENCY ADJUSTMENT (2) (L1 : VIDEO D/A)

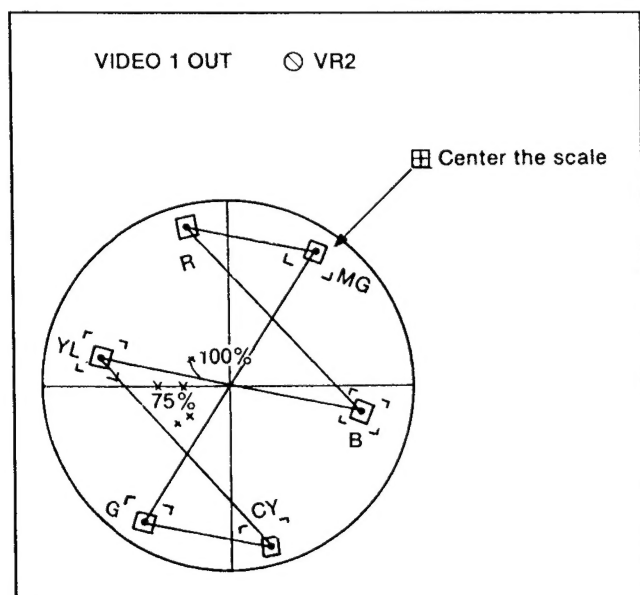
TEST	VIDEO 1 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	VECTOR SCOPE
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR2[L8]

<STEP 1>

1. VECTOR SCOPE : VIDEO 1 OUT
2. Adjust VR2 so that the each vector is in center the scale of Vector Scope.

<STEP 2>

1. Confirm that the each vector position is in the box of vector scope when put back the L1 board into the VTR.



1-4. VIDEO OUTPUT DC LEVEL ADJUSTMENT (L1 : VIDEO D/A)

TEST	TP4[J8]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR4(CLAMP DC LEV)[L7]

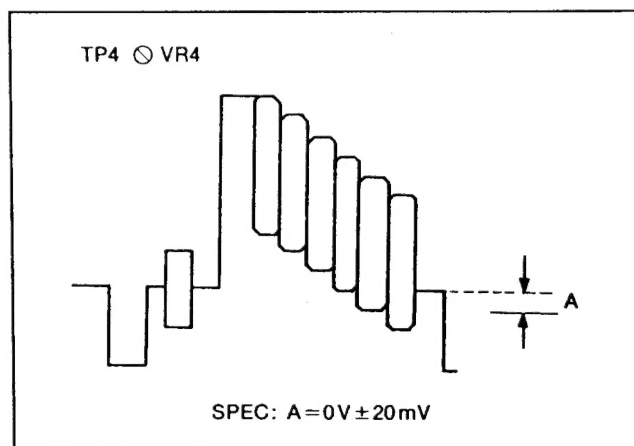
<STEP 1>

MACHINE CONDITION

Connect the 75Ω termination to VIDEO 1 OUT.

<STEP 2>

1. SCOPE : TP4
2. Adjust VR4 so that the Pedestal DC level is $0V \pm 20mV$ as shown in Figure.

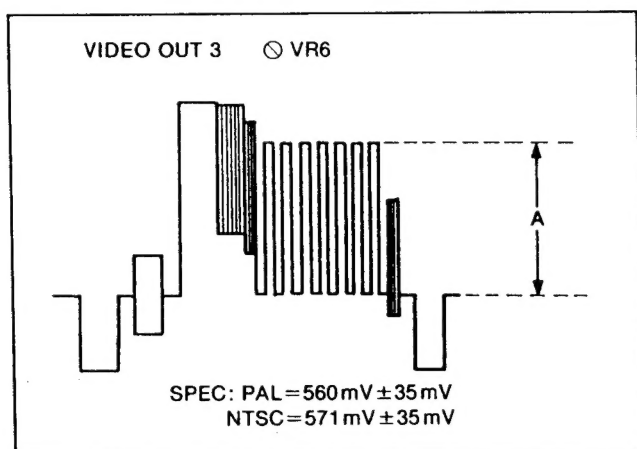


1-5. CHARACTER LEVEL ADJUSTMENT (L1 : VIDEO D/A)

TEST	VIDEO 3 OUT (SUPER)
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR6 (CHAR LEVEL)[J8]

<STEP 1>

1. SCH METER : VIDEO 3 OUT
2. Adjust VR6 so that the Character level "A" is 80IRE \pm 5IRE as shown in Figure. NTSC=571mV \pm 35mV.



1-6. WFM OUTPUT LEVEL ADJUSTMENT (L1 : VIDEO D/A)

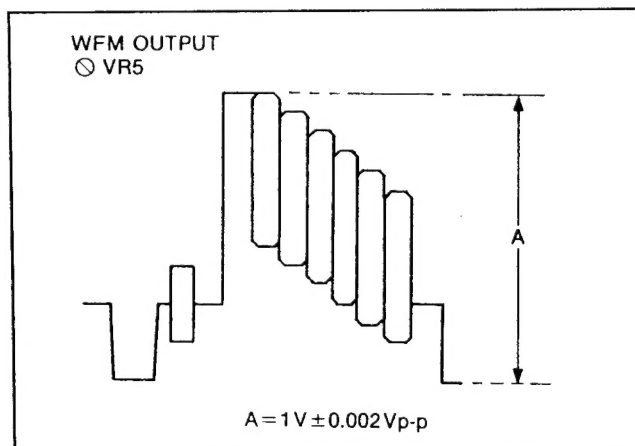
TEST	WFM OUTPUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR5 (RET V LEVEL)[L6]

<STEP 1>

MENU CONDITION
VIDEO OUT MENU : F9
Select the WFM to A INPUT

<STEP 2>

1. SCH METER : WFM OUTPUT
2. Adjust VR5 so that Input level "A" is 1V \pm 0.002Vp-p as shown in Figure.



<STEP 3>

MENU CONDITION
VIDEO OUT MENU : F9
Select the WFM to "OUTPUT"

<STEP 4>

1. SCH METER : WFM OUTPUT
2. Confirm that the Output level "A" is 1V \pm 0.002Vp-p as shown in Figure.

Refer to above Figure in <STEP 2>

4. VIDEO PROCESS (L4) BOARD

MACHINE CONDITION (SET UP CONDITION 1)

Adjustment with this section, perform after completed adjustment with L1 section.

MENU CONDITION 1

AUDIO IN MENU

Select the VIDEO INPUT F3 to "ANALOG"

VIDEO OUT SET UP MENU

Select the VIDEO STANBY OFF to "EE2"

STANBY OFF

VIDEO : EE2

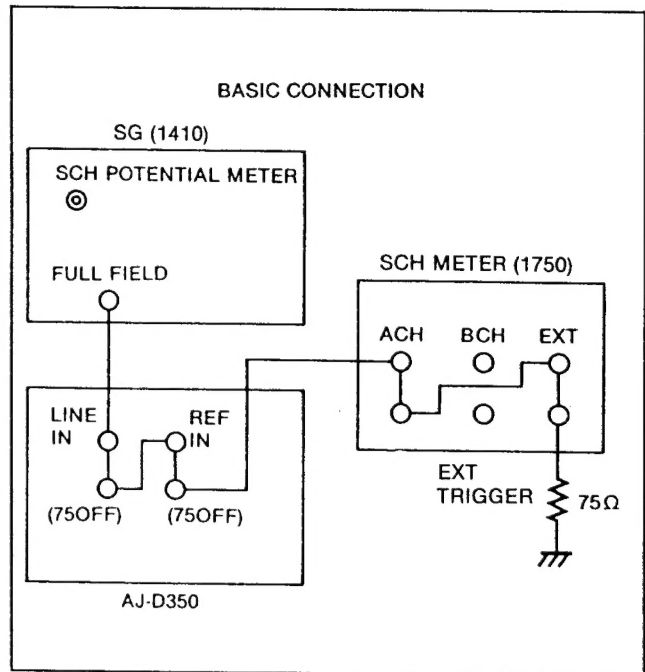
MENU CONDITION 2

TEST MENU

VIDEO FUNCTION

Press the SCH F10 Key on the Front

Panel and display the OUT REF SCH METER.

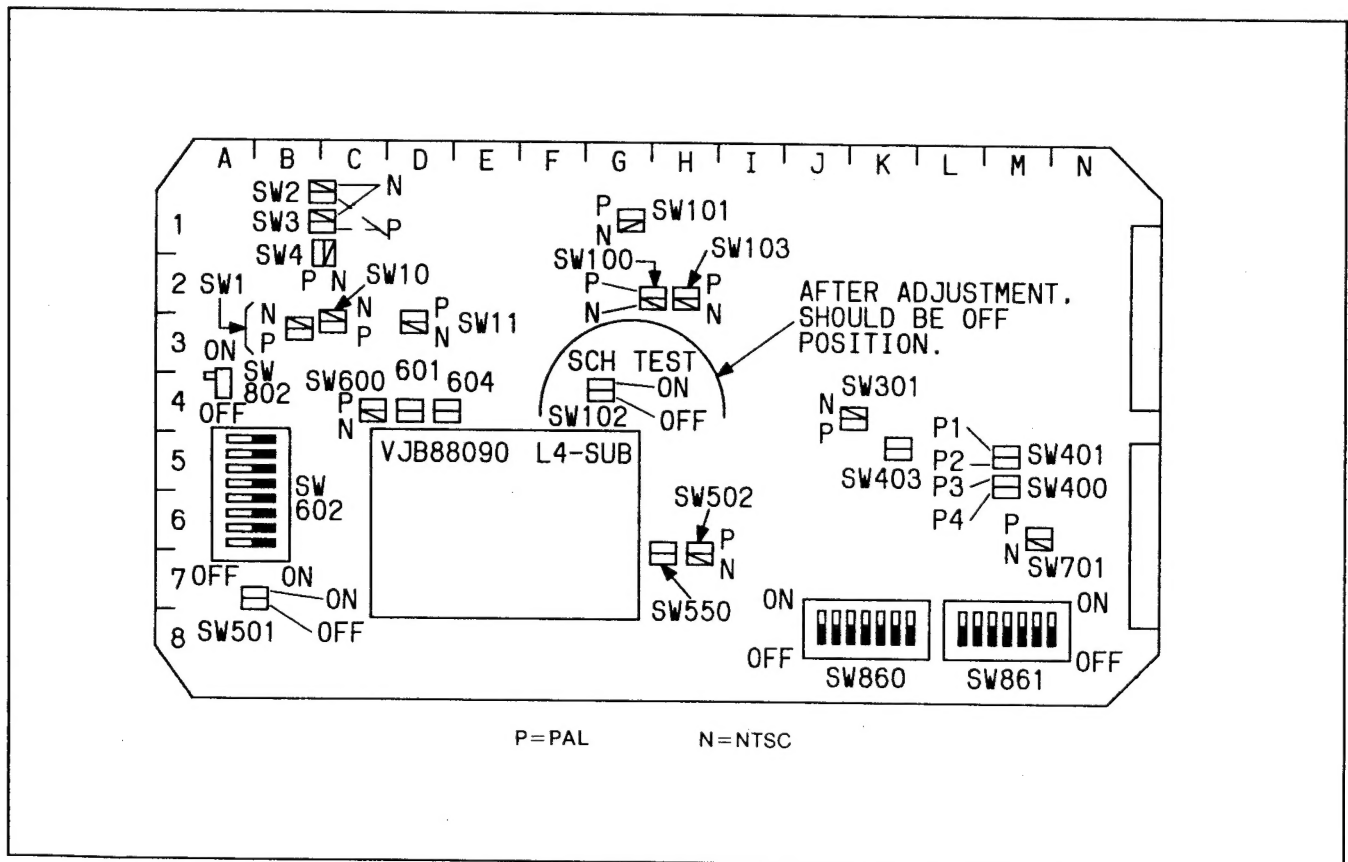


ADJUSTMENT SECTION

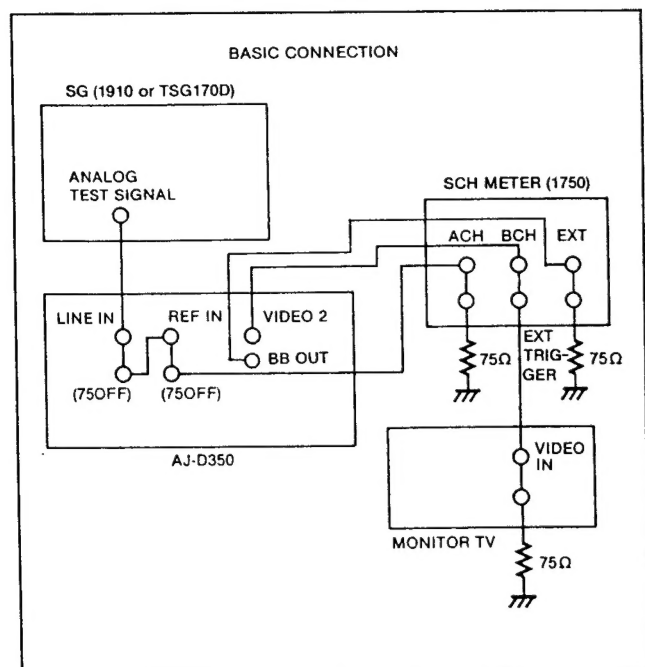
4-7. SCH METER ADJUSTMENT

4-9. REF CF DETECTION (3) ADJUSTMENT

4-6. REF SCH ADJUSTMENT



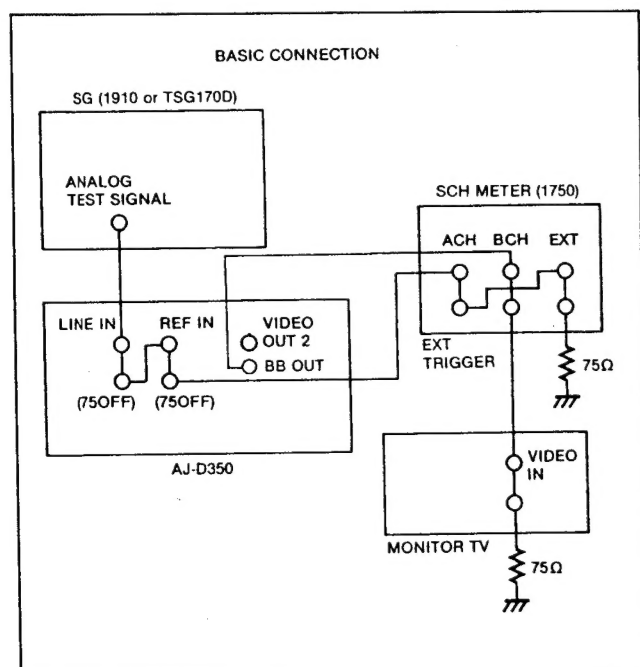
MACHINE CONDITION (SET UP CONDITION 2)



ADJUSTMENT SECTION

- 4-11. SYS SC PHASE ADJUSTMENT
- 4-12. SYS SC PHASE (2) ADJUSTMENT

MACHINE CONDITION (SET UP CONDITION 3)



ADJUSTMENT SECTION

- 4-13. BB OUT SYNC LEVEL ADJUSTMENT
- 4-14. BB OUT SC PHASE ADJUSTMENT
- 4-15. BB OUT SCH ADJUSTMENT
- 4-16. BB OUT H PHASE (1) ADJUSTMENT
- 4-17. BB PIT H PHASE (2) ADJUSTMENT
- 4-18. BB OUT BURST LEVEL ADJUSTMENT
- 4-19. BB OUT BURST POSITION & WIDTH ADJUSTMENT

4-1. BF PULSE POSITION ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	TP9[I1], TP1[I3], TP3[G3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR1 (VF POS)[F3]

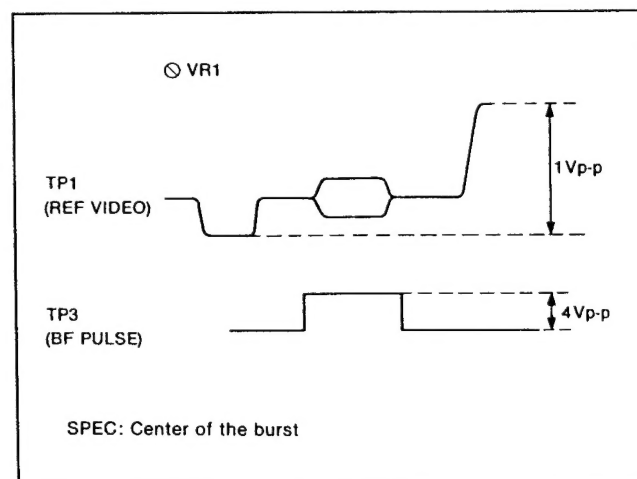
8000 SERIES

<STEP 1>

1. SCOPE : TP9
2. Confirm that the DC voltage is $2.25 \pm 0.1V$ DC.

<STEP 2>

1. SCOPE CH1 : TP1
CH2 : TP3
2. Adjust VR1 so that the BF pulse is centered on the burst signal as shown in Figure.



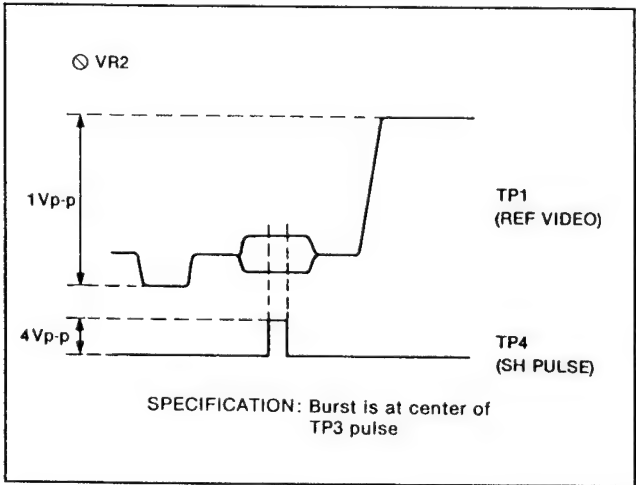
4-2. SH PULSE POSITION ADJUSTMENT
(L4 : VIDEO PROCESS)

TEST	TP1[I3], TP4[G3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR2 (SH POS)[F3]

8000 SERIES

<STEP 1>

- SCOPE CH1 : TP1
CH2 : TP4
- Adjust VR2 so that the SH pulse is located at center of the burst signal as shown in Figure.



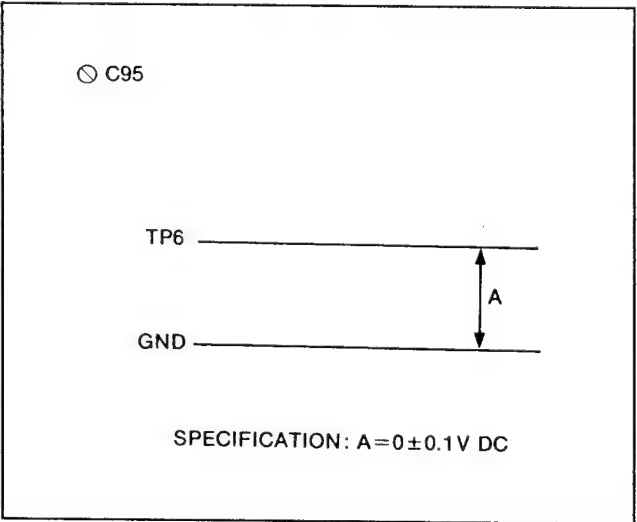
4-3. REF PLL ADJUSTMENT
(L4 : VIDEO PROCESS)

TEST	TP6[I2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	C95 (REF CLK FREQ)[I1]

8000 SERIES

<STEP 1>

- SCOPE CH1 : TP6
- Adjust C95 so that the DC voltage is $0 \pm 0.1V$ DC.



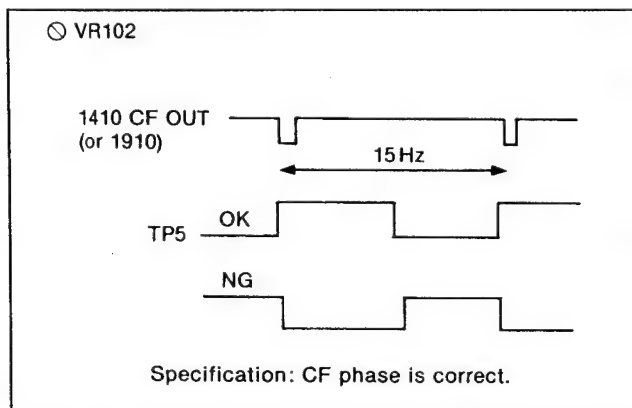
4-4. REF CF DETECTION ADJUSTMENT (1) (COARSE ADJ.) (L4 : VIDEO PROCESS)

TEST	TP5[H2]
MODE	EE2 (EJECT), SW102 (SW TEST)[D6] is ON
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR102 (LEVEL DET)[L2]

8000 SERIES

<STEP 1>

1. Confirm that the jumper SW102 is set to ON side.
2. SCOPE CH1 : 1410 or 1910 CF OUT
CH2 : TP5
3. Adjust VR102 so that the CF Pulse rise on head portion of color frame 4. This adjustment is coarse adjustment. The next "REF CF DETECTION ADJUSTMENT (2)" should be adjusted.
SW102 is set to OFF position after next adjustment is completed.



Note: 1910 needs CF out modification.
Please contact with TEKTRONIX for this modification.

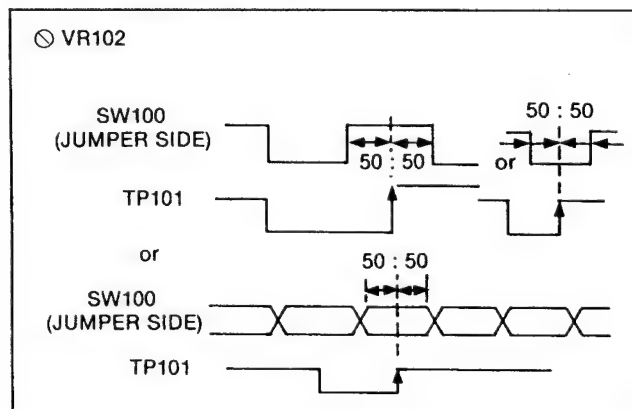
4-5. REF CF DETECTION ADJUSTMENT(2) (FINE ADJ.)(L4 : VIDEO PROCESS)

TEST	TP101[L3], SW100[L3]
MODE	EE2(EJECT), SW102(SCHETEST)[D6] is ON
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR102 (LEVEL DET)[L2]

8000 SERIES

<STEP 1>

1. SCOPE CH1 : TP101
CH2 : SW100 Jumper side
2. Adjust VR102 so that the rising edge of the TP101 is at center of the High or Low period of 3.58MHz pulse at SW100 jumper side.
3. The upper of the drawing shows the trigger is stable and lower of it shows the trigger is unstable.
4. Set SW102 to OFF side.



4-6. REF SCH DETECTION ADJUSTMENT

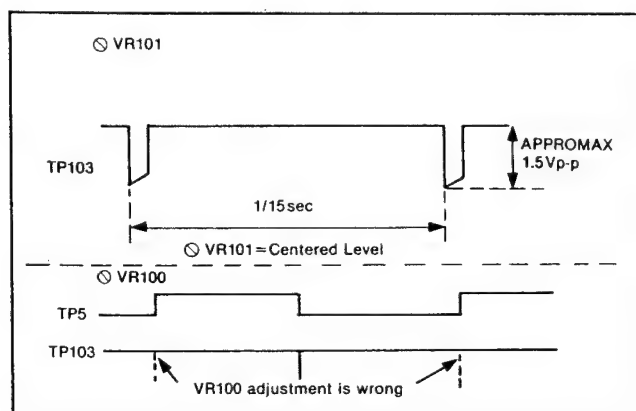
(1)(L4 : VIDEO PROCESS)

TEST	TP5[H2], TP103[M3]
MODE	EE2 (EJECT), SW102 (SCH TEST)[D6] ON
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG170 or 1410 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR101 (SCH DET 2)[M2], VR100 (SCH DET 1)[L1]

8000 SERIES

<STEP 1>

1. Set SW102 (SCH TEST) to ON position.
2. Set VR100 (SCH DET 1) at center position.
3. SCOPE CH1 : TP103
CH2 : TP5
4. Confirm that pulse signal of TP103 level is changed, when turn VR101 to clockwise or counter-clockwise.
5. Adjust VR101 so that the pulse at TP103 is centered level between minimum (0V) and maximum (2 ~ 3V).
6. If the VR100 position is incorrect. The unstable pulse appear as shown in the bottom of the figure. In this case adjust VR100 so that pulse position is stable and adjust item 5 again.



4-7. SCH METER ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	OUT REF SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1410 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR105 (SCH GAIN [K4], VR106 (SCH OFFSET)[K4]

8000 SERIES

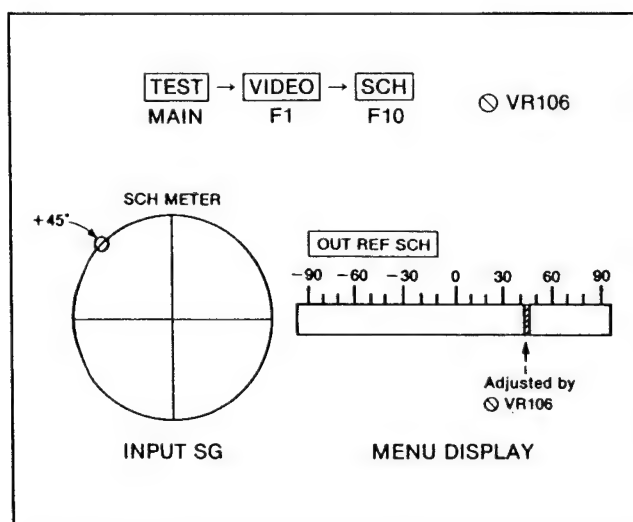
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.(Page 6)

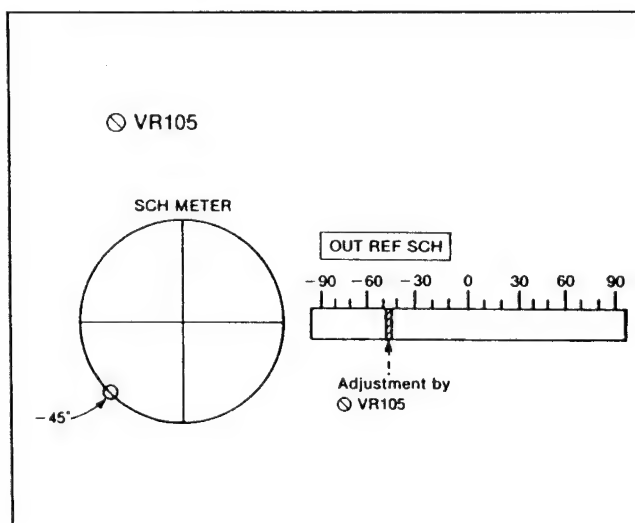
<STEP 2>

1. SCH METER : SCH MODE
2. Adjust the Potention Meter VR on 1410 so that the SCH phase becomes +45° at SCH METER.(Page 6)
3. Display the OUT REF SCH METER as follows TEST → F1 VIDEO → F10 SCH.
4. Adjust VR106 so that the OUT REF SCH METER displayed +45°.



<STEP 3>

1. Adjust the Potention Meter VR on 1410 so that the SCH phase becomes -45° at SCH METER.
2. Display the OUT REF SCH METER VR as follows TEST → F1 VIDEO → F10 SCH.
3. Adjust VR105 so that the OUT REF SCH METER displayed -45°.



<STEP 4>

1. Re-adjust above <STEP 2> and <STEP 3> until stabilize the position of VR105 and VR106.

4-8. REF SCH DETECTION ADJUSTMENT (2)(L4 : VIDEO PROCESS)

TEST	TP104[L3], TP105[J3], TP106[J3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (OSCILLOSCOPE)
INPUT	1410 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR103 (SCH -L)[J2], VR104 (SCH -H)[J2]

8000 SERIES

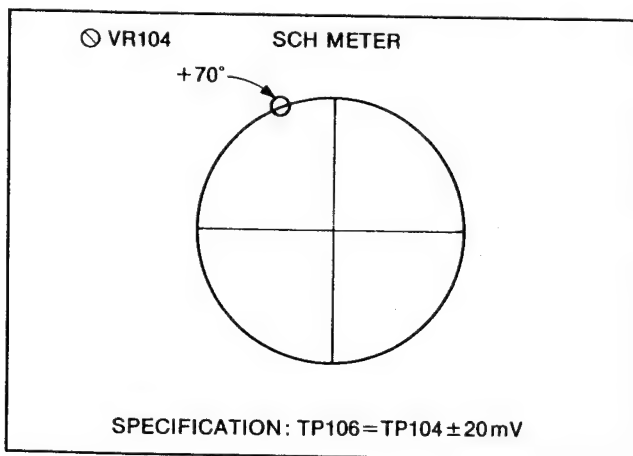
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.(Page 6)

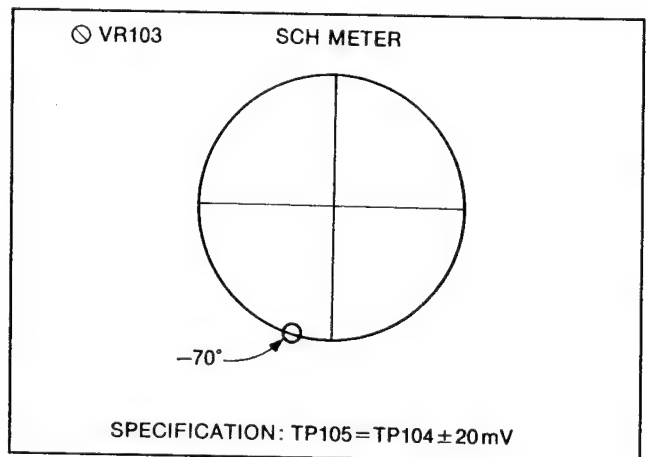
<STEP 2>

1. SCH METER : SCH MODE
2. Adjust the Potention Meter VR on 1410 so that the SCH phase becomes +70° at SCH METER.
3. SCOPE CH1 : TP106
CH2 : TP104
4. Measure the voltage at TP104.
5. Adjust VR104 so that the DC voltage at TP106 is TP104 \pm 20mV.



<STEP 3>

1. Adjustment the Potention Meter VR on 1410 so that the SCH phase becomes -70° at SCH METER.
2. SCOPE CH1 : TP105
CH2 : TP104
3. Measure the voltage at TP104.
4. Adjust VR103 so that the DC voltage at TP105 is TP104 \pm 20mV.



4-9. REF SCH DETECTION ADJUSTMENT (3)(L4 : VIDEO PROCESS)

TEST	OUT REF SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN, SCH = 0°
ADJ.	VR101 (SCH DET 2)[M2]

8000 SERIES

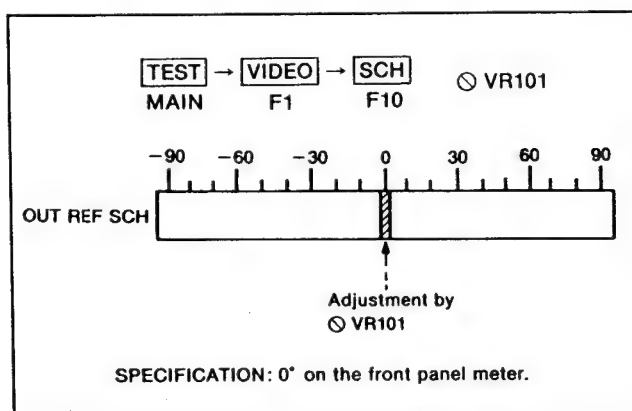
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.

<STEP 2>

1. Confirm the test signal generator output SCH is 0°.
2. Turn the power OFF and ON.
3. Display the OUT REF SCH METER on TEST VIDEO MENU.
4. Adjust VR101 so that the OUT REF SCH METER displayed 0°.



4-10. SYS PLL ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	TP108[K2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR108[K2]

8000 SERIES

<STEP 1>

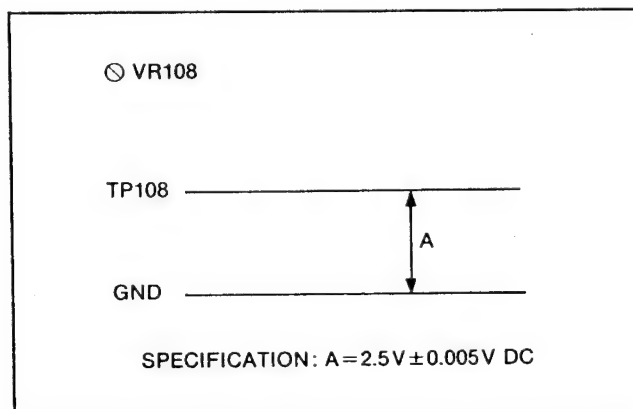
MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.

<STEP 2>

1. SCOPE : TP108
2. Adjust VR108 so that the DC voltage is $2.5V \pm 0.005V$ DC.

SPECIFICATION : $2.5V \pm 0.005V$ DC



4-11. BB OUT SYNC LEVEL ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR202 (BB SYNC GAIN)[O3], VR203 (BB C LEVEL)[N1]

8000 SERIES

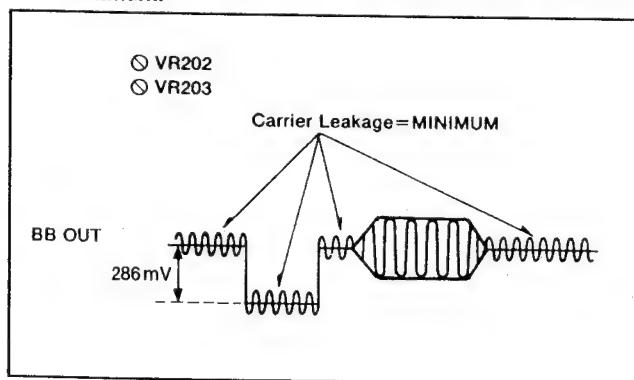
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

<STEP 2>

1. SCH METER : WFM mode
2. SCH METER INPUT : CHA : SG VIDEO
CHB : BB OUT
3. Adjust VR202 so that the Sync level of BB is 286mV as shown in Figure. Confirm the sync level is same with CHA (SG Video sync level).
4. Adjust VR203 so that the carrier leak is become minimum.



4-12. BB OUT SC PHASE ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	REF VIDEO BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM, SCH MODE)
INPUT	ANALOG 75% COLOR BAR to VIDEO IN
ADJ.	VR204 (BB C PHASE)[O3], VR3 (H POS 1) [G3], VR5 (H POS 2)[F1]

8000 SERIES

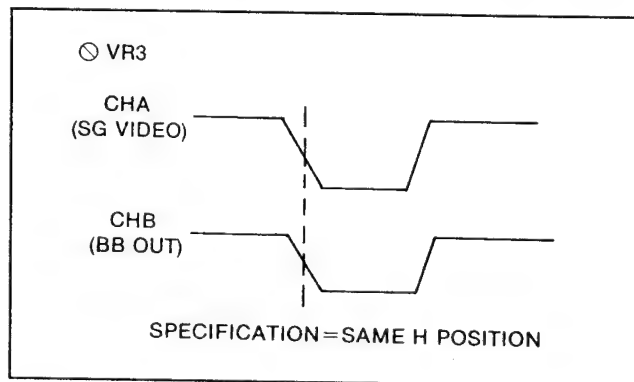
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

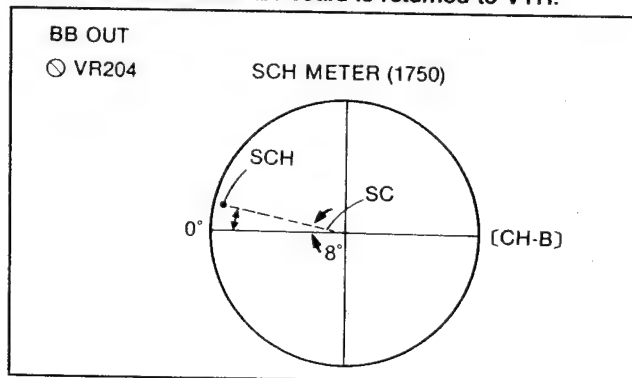
<STEP 2>

1. SCH METER : WFM mode, EXT trigger
2. SCH METER INPUT : CHA : SG VIDEO
CHB : BB OUT
3. Adjust VR3 so that the H phase of BB out is same H sync phase with CHA (SG VIDEO) at center position. This is a coarse adjustment of VR3.



<STEP 3>

1. SCH METER : SCH mode, EXT trigger
CHA : SG VIDEO
CHB : BB OUT
2. Set the SCH meter CHA position at correct position. Select SCH meter to CHB.
3. Adjust VR5 so that the SCH of B.B out delayed +8° against REF IN.
4. Adjust VR204 so that the burst phase delayed +8° against burst on CHA.
5. +8° delay is caused by extension board. The SCH becomes 0° when L4 board is returned to VTR.



4-15. BB OUT H PHASE ADJUSTMENT
(1)(L4 : VIDEO PROCESS)

TEST	BB OUT TP303[A3], TP304[B2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE) OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR3 (H POS 1)[G3]

8000 SERIES

<STEP 1>

MACHINE CONDITION

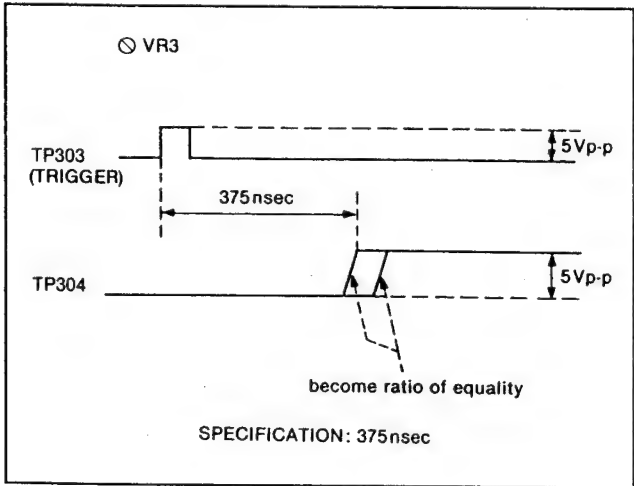
Refer to SET UP Condition 3 at the beginning of this SECTION.

<STEP 2>

1. WFM : BB OUT
EXT REF TRIGGER
2. Confirm the BB out H phase is stable.

<STEP 3>

1. SCOPE CH1 : TP303 (TRIGGER)
SCOPE CH2 : TP304
2. Adjust VR3 so that H phase is the same phase against the H phase on CHA.



4-16. SYS SC PHASE ADJUSTMENT
(L4 : VIDEO PROCESS)

TEST	VIDEO OUT 2
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	TSG273 75% COLOR BAR to VIDEO IN
ADJ.	VR107 (SYS SC OFFSET)[E2]

8000 SERIES

<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 2 at the beginning of this SECTION.

<STEP 2>

MENU CONDITION

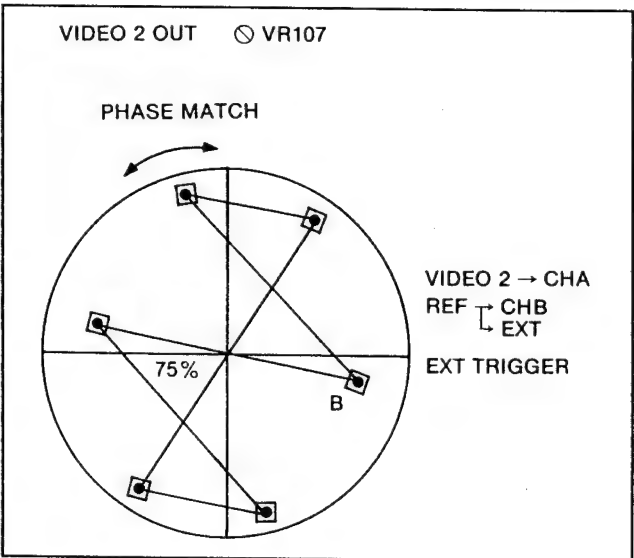
VIDEO OUT MENU : F7
Select the SC to "UNITY" mode.

<STEP 3>

1. SCH METER : SCH : MODE
2. SCH INPUT : CHA
3. Adjust the phase VR on SCH METER so that the burst phase becomes standard position at SCH METER.

<STEP 4>

1. SCH INPUT : CHB
2. Adjust VR107 so that the burst phase becomes the same phase as REF VIDEO (CHA).



4-17. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (1) (L4 : VIDEO PROCESS)

TEST	TP5[H2], TP1[I3], VIDEO OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR TO VIDEO IN and REF VIDEO IN
ADJ.	Confirmation only

8000 SERIES

<STEP 1>

1. Confirm that the adjustment of L2 and S9 sections are completed.

<STEP 2>

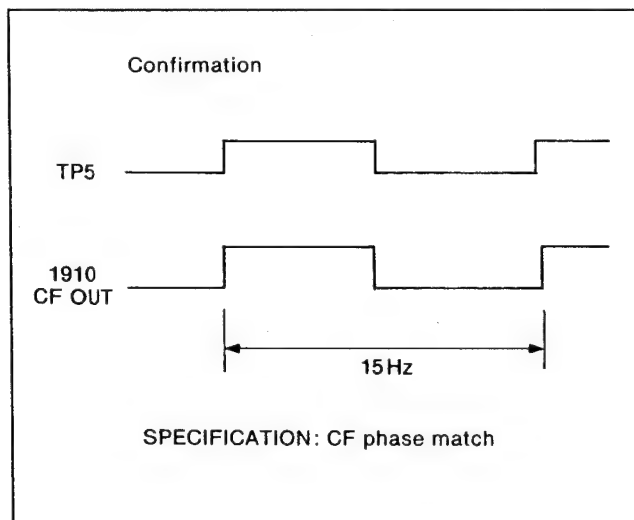
MENU CONDITION

HOME MENU SET UP

Select the OUT REFERENCE to "INCOM".

<STEP 3>

1. SCOPE CH1 : TP1
CH2 : TP5
2. Confirm that the relation between REF VIDEO and CF pulse is as shown in Figure.



4-18. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (2) (L4 : VIDEO PROCESS)

TEST	VIDEO OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	75%COLOR BAR to VIDEO IN and VIDEO IN
ADJ.	VR4 (1H POS)[I4] (COARSE)

8000 SERIES

<STEP 1>

1. Confirm that the adjustment with L2 and S9 sections completed.

<STEP 2>

MENU CONDITION

HOME MENU SET UP

Select the OUT REFERENCE to "INCOM".

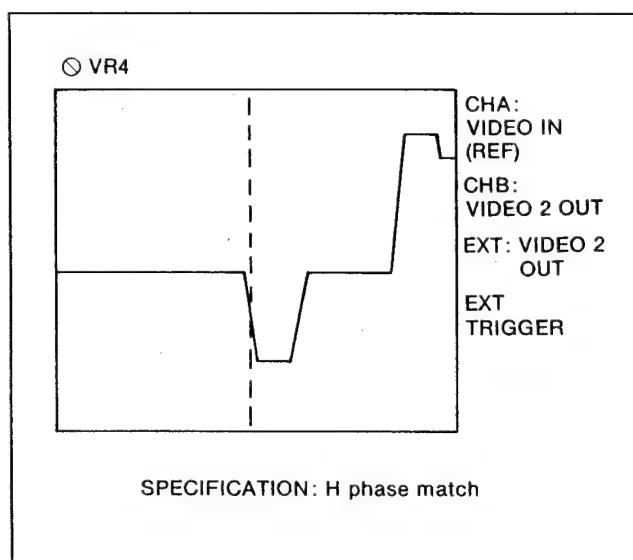
<STEP 3>

MACHINE CONDITION

Refer to SET UP CONDITION 2 at the beginning of this SECTION.

<STEP 4>

1. SCH METER : WFM Mode
2. Adjust VR4 so that the H phase on CHB is matched REF signal (CHA).



4-19. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (3) (L4 : VIDEO PROCESS)

TEST	TP303[A3], TP304[B2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR4 (IH POS)[I4] (FINE)

<STEP 1>

8000 SERIES

1. Confirm that the adjustment with L2 and S9 sections completed.

<STEP 2>

MENU CONDITION

HOME MENU SET UP

Select the OUT REFERENCE to "INCOM".

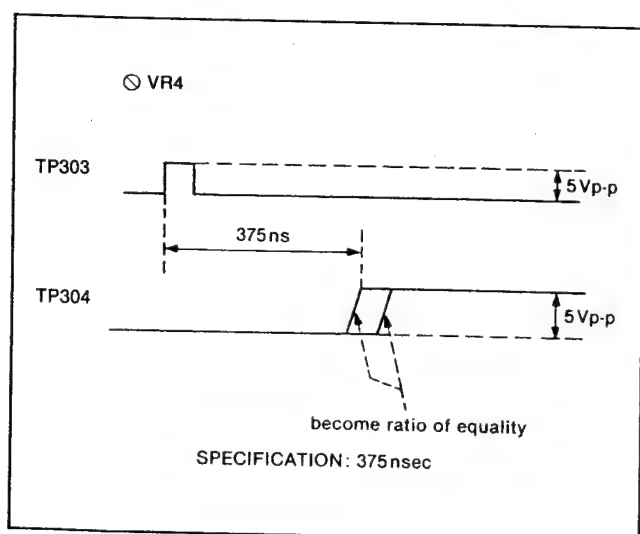
<STEP 3>

MENU CONDITION

Refer to SET UP CONDITION 2 at the beginning of this SECTION.

<STEP 4>

1. SCOPE CH1 : TP303
CH2 : TP304
2. SCOPE TRIGGER : CH1
3. Adjust VR4 so that the relation between HC signal as shown in Figure.



4-20. DIGITAL VIDEO OUT CLOCK PHASE ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	DIGITAL VIDEO OUT 25pin D-SUB
MODE	EE1
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	SW860 [M8], SW861 [M8]

<STEP 1>

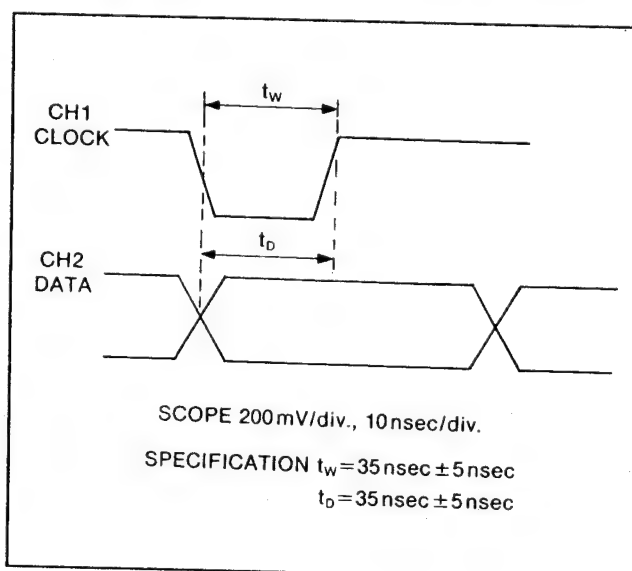
8000 SERIES

SCOPE CH1 : DIGITAL VIDEO OUT D-SUB 1Pin
CH2 : DIGITAL VIDEO OUT D-SUB 7Pin

<STEP 2>

Adjust SW860 and SW861 so that the clock and data phase is shown in figure.

- (1) Set SW861-7bit to ON and SW860 -2bit to ON or set SW861-8bit to ON and set one of the bit of SW861 bit1 - bit5 to ON.



5. REC/PLAY CH0 (S1) BOARD REC/PLAY CH1 (S2) BOARD

Adjust procedure with S1 and S2 board the same.

MACHINE CONDITION

Set the SW51 on the L2 board to OFF as shown in Figure 1.
Turns Line and Field shuffle off.

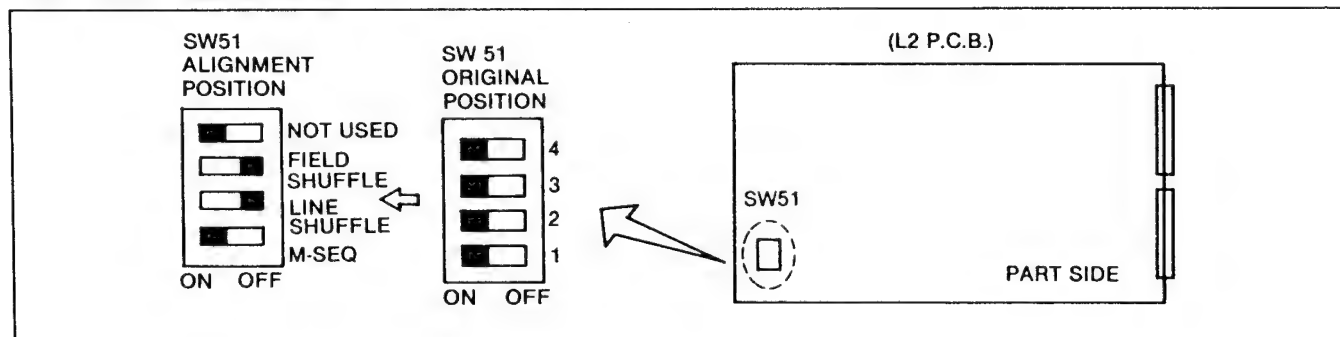


Figure 1.

1. Set the SW1, 2, 3 and 4 on the L3 P.C.B. follow the Figure 2.
2. Set the SW802 on the L4 P.C.B. follow the Figure 2.
3. Confirm that the 5 LED's are turned ON.

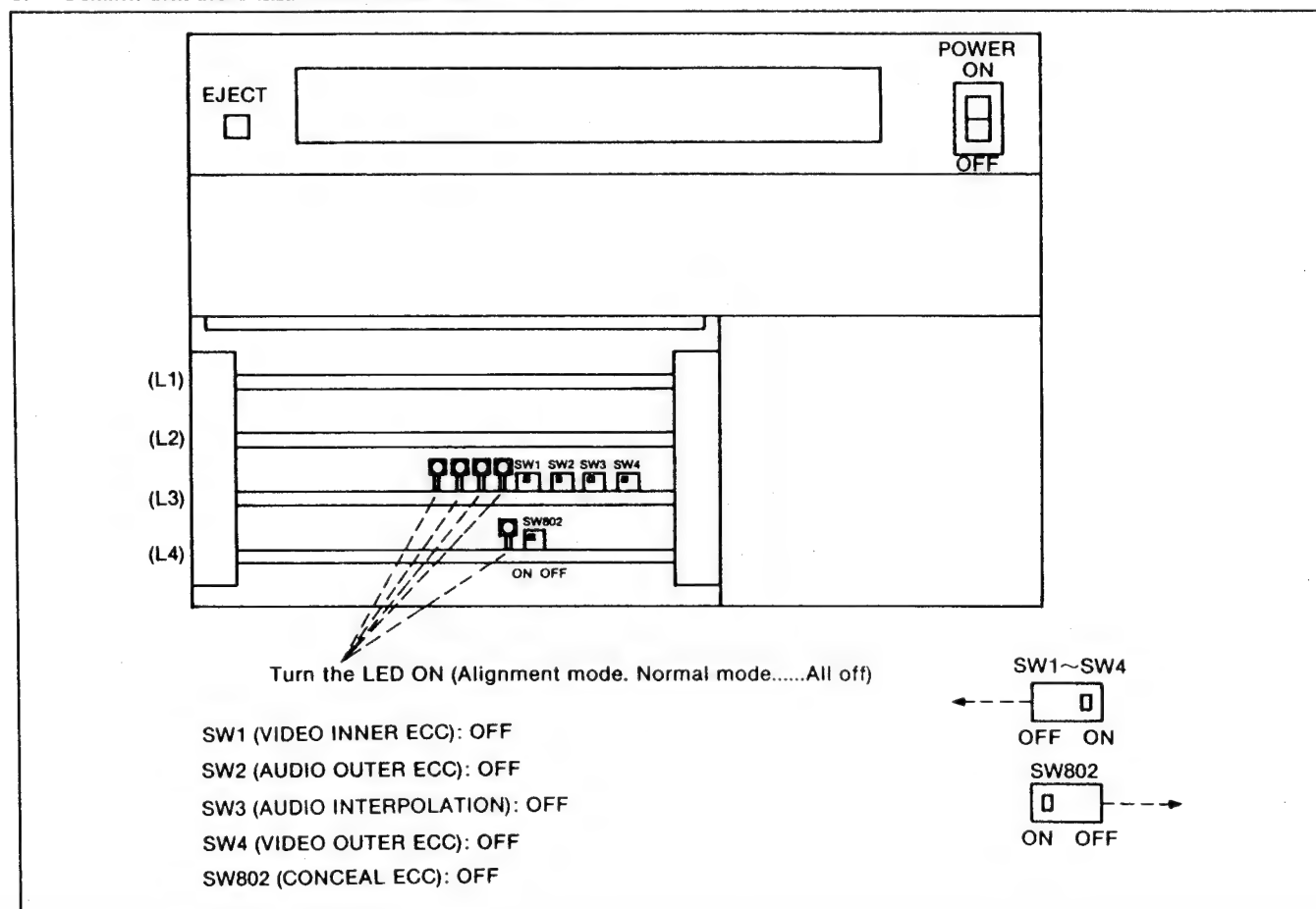


Figure 2.

Set the Dip SW's on the S1 and S2 P.C.B. follow the as shown in Figure 3.

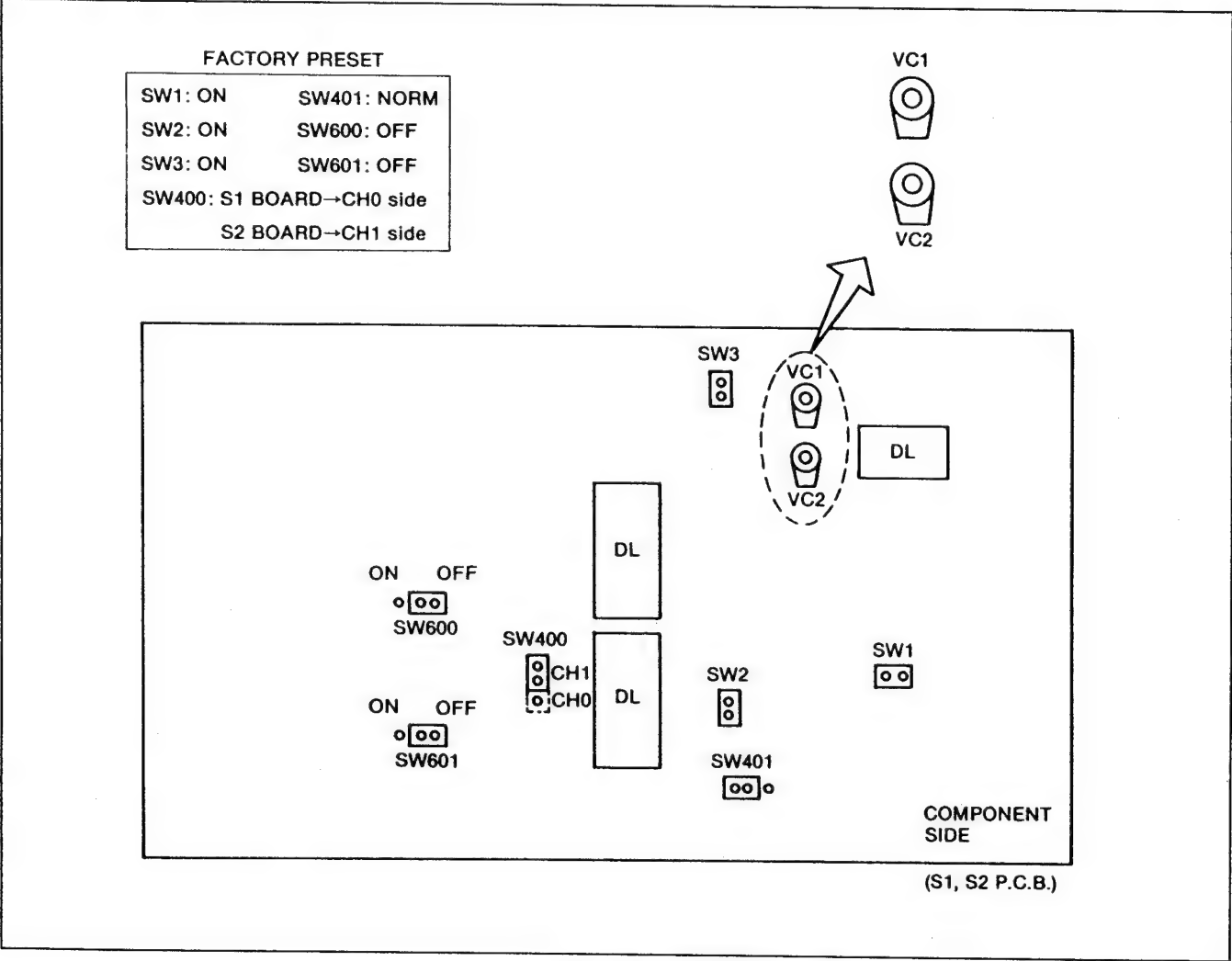
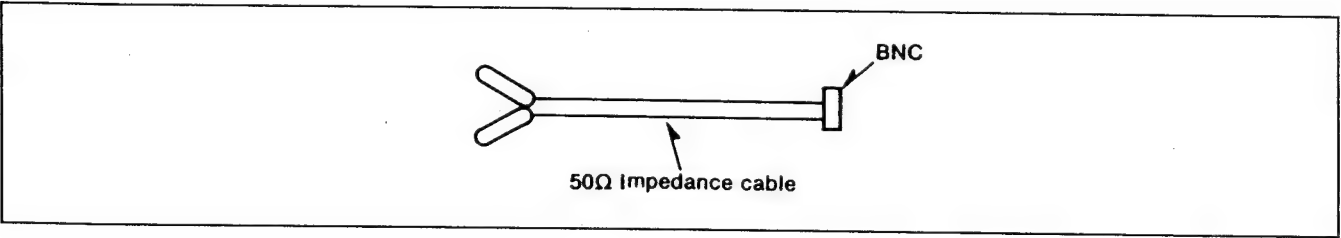
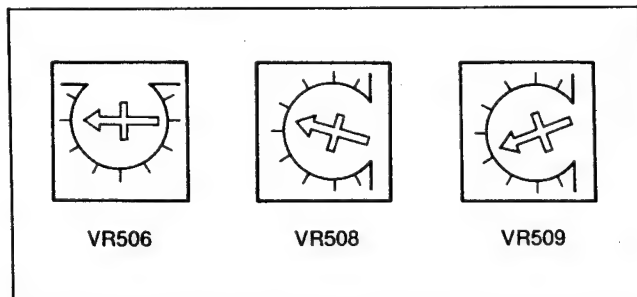


Figure 3.



- Note:**
1. These VRs are not used as follows.
VR600,VR601,VR602,VR603,VR604,
VR605,VR606,VR607,VR614,VR615
 2. Set the VR506, VR508 and VR509 as follows.



5-1. PLL ADJUSTMENT

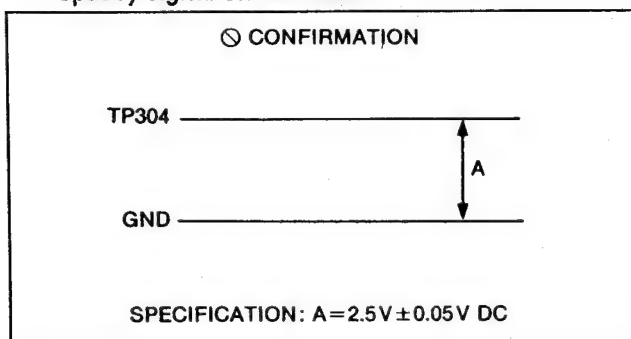
(S1 : REC/PLAY CH0)
(S2 : REC/PLAY CH1)

<STEP 1>

SPEC	TP304 = 2.5V DC \pm 0.05V DC
TEST	TP304[A1]
MODE	VIDEO OUT SET UP STATE EE2,STBY OFF
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	

5000 SERIES

1. SCOPE : TP304
2. Set VTR into STAND BY OFF mode.
3. Confirm that the DC voltage is $2.5 \pm 0.05V$ DC. If it is not confirm the Servo HT (Head Tape relative speed) signal on S5 board.



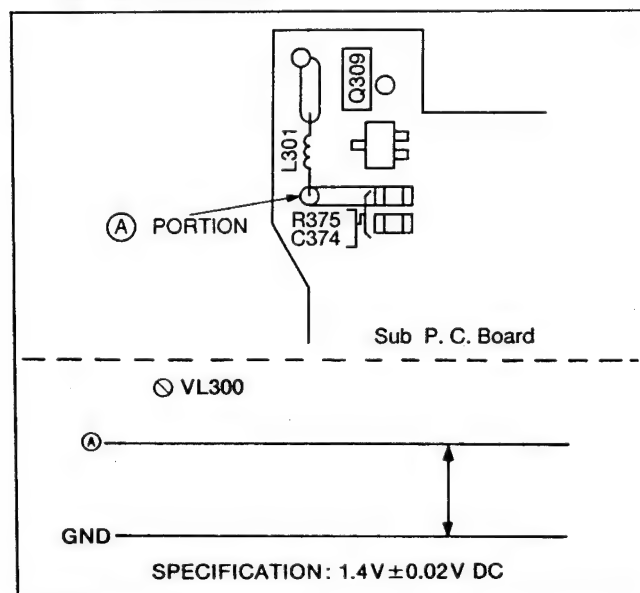
PLL ADJUSTMENT

<STEP 2>

SPEC	1.4V DC \pm 0.02V
TEST	L301 Lower Side
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VL300 (OSC OFFSET)[B1]

5000 SERIES

1. SCOPE : L301 Lower Side
2. Adjust VL300 (OSC OFFSET) so that the voltage is $1.4 \pm 0.02V$ DC.



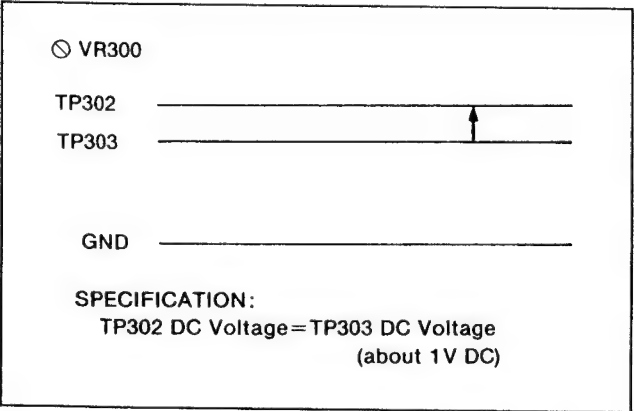
PLL ADJUSTMENT

<STEP 3>

SPEC	TP303 DC VOLT = TP302 DC VOLT
TEST	TP302 [C1], TP303 [B1]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR300 (PLL OFFSET)[A1]

5000 SERIES

- SCOPE CH1 : TP302
CH2 : TP303
- Adjust VR300 (PLL OFFSET) so that the voltage of TP302 and TP303 are same.



PLL ADJUSTMENT

<STEP 4>

SPEC	TP300 IS MAXIMUM PEAK TO PEAK
TEST	TP300 [B2]
MODE	TAPE mode STBY OFF
TAPE	COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR10 (COMP BIAS)[F1]

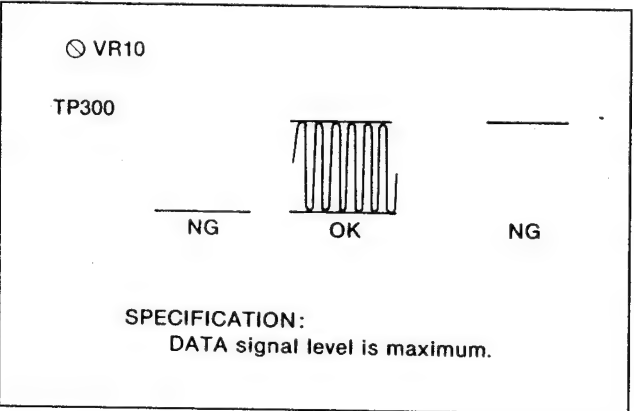
5000 SERIES

- Insert an adjustment tape color bar portion.
- Set the STBY OFF status to "TAPE" mode.

VIDEO OUT SET UP TAPE

- Set the VTR into STBY OFF mode.
- SCOPE : TP300
- Adjust VR10 (COMP BIAS) so that the data signal level is maximum.

Note: Set the 20MHz Filter of oscilloscope to OFF mode.



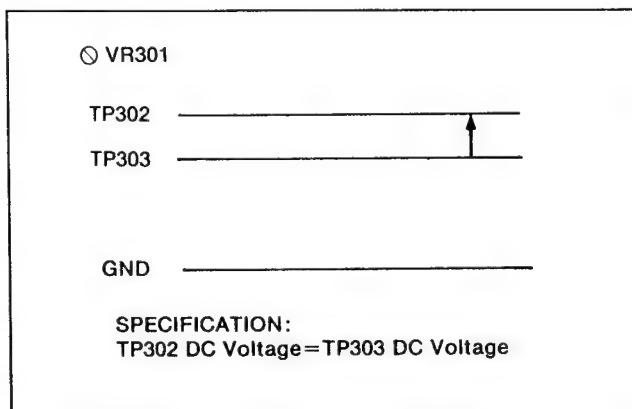
PLL ADJUSTMENT

<STEP 5>

SPEC	TP302 DC VOLTAGE = TP303 DC VOLTAGE
TEST	TP302 [B1], TP303 [B1]
MODE	TAPE mode STBY OFF
TAPE	COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR301 (DC BALANCE)[C1]

5000 SERIES

- SCOPE CH1 : TP302
CH2 : TP303
- Adjust VR301 (DC BALANCE) so that the voltage of TP302 and TP303 are same.



PLL ADJUSTMENT

<STEP 6>

SPEC	TP301 CLOCK IS LOCKED WITH TP300
TEST	TP301 [B2], TP300 [B2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	400MHz OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	CONFIRMATION ONLY

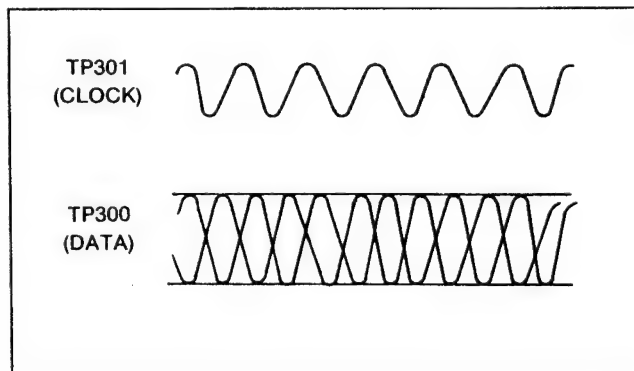
5000 SERIES

- Set the STBY OFF status to "EE2" mode.

VIDEO OUT SET UP

- SCOPE CH1 : TP301/TPG300
CH2 : TP300 --- TRIGGER
- SCOPE : 500mV/AC
SETTING : SWEEP = 10nsec/div
- Confirm that the DATA signal and CLOCK signal are frequency locked.

Note: Set the 20MHZ Filter of oscilloscope to OFF mode.



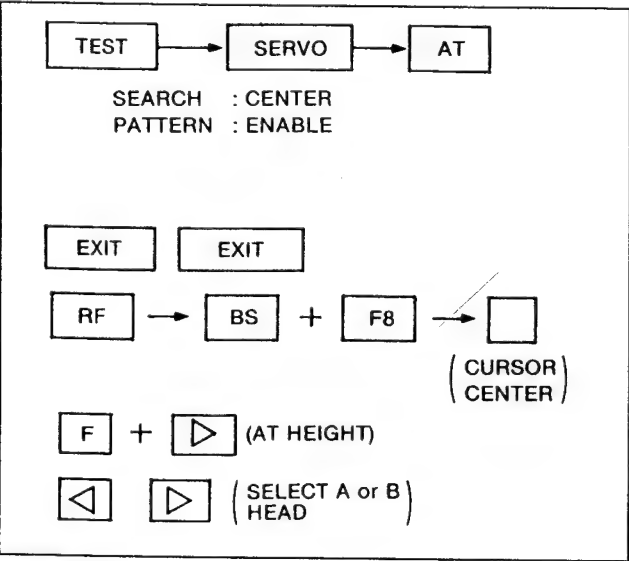
5-2. ENVELOPE MAX ADJUSTMENT
(S1 : REC/PLAY CH0)
(S2 : REC/PLAY CH1)

SPEC	RF ENVELOPE IS MAXIMUM
TEST	TP8[E2],P3-B22(RIGHT SIDE) of Extension Board
MODE	VAR (X1)
TAPE	SHUFFLING OFF 75% COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	Adj. KNOB (on the Front Panel), AT HEIGHT

5000 SERIES

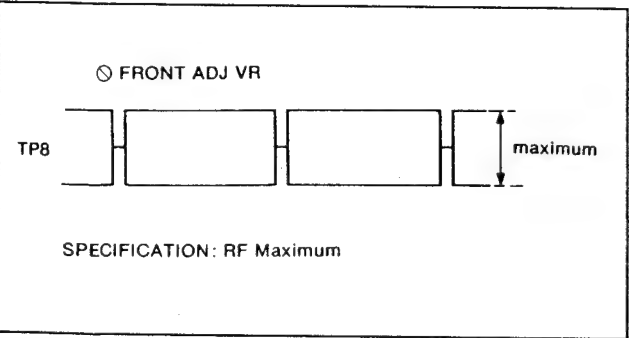
<STEP 1>

MENU CONDITION
TEST SERVO AT HEIGHT



<STEP 2>

1. Playback a shuffling off 75% Color bar Alignment Tape on VAR X1 mode.
2. Adjust the Adj. KNOB VR on the Front Panel so that the Envelope is maximum.



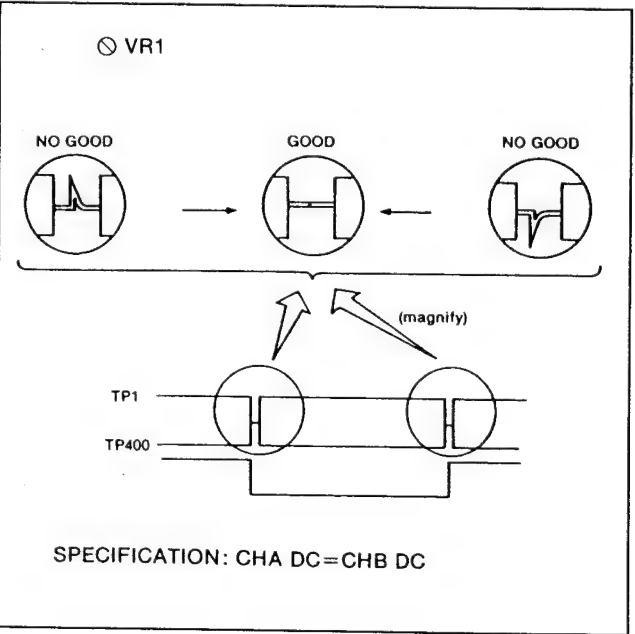
5-3. AB DC BAL ADJUSTMENT
(S1 : REC/PLAY CH0)
(S2 : REC/PLAY CH1)

SPEC	CHA DC = DC
TEST	TP1[H3], TP400[F4]
MODE	VAR (X1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1 (A/B DC BAL)[H1]

5000 SERIES

<STEP 1>

1. SCOPE CH1 : TP1 : TPG1
CH2 : TP400
2. SCOPE CH1 : 50mV/DC 50Ω
CH2 : 5V/DC
3. SCOPE MODE : CH0P
4. SCOPE TRIG : CH4
5. SCOPE SWEEP : A = 2ms/div
B = 50μS/div
6. Adjust VR1 so that the Envelope is as shown in Figure.



5-4. ENVELOPE DETECTION ADJUSTMENT

(S1 : REC/PLAY CH0)
(S2 : REC/PLAY CH1)

SPEC	ENVELOPE MINIMUM DC LEVEL = $0V \pm 0.2VDC$ ENVELOPE MAX. = $2Vp-p \pm 0.2V$
TEST	TP502 [H4], TP400 [F4], TP8 [E2]
MODE	STILL
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2(A/B GAIN BAL)[H1], VR500(ENV GAIN)[I4], VR501 (ENV OFFSET) [I4]

5000 SERIES

<STEP 1>

MENU CONDITION

TEST SERVO AT

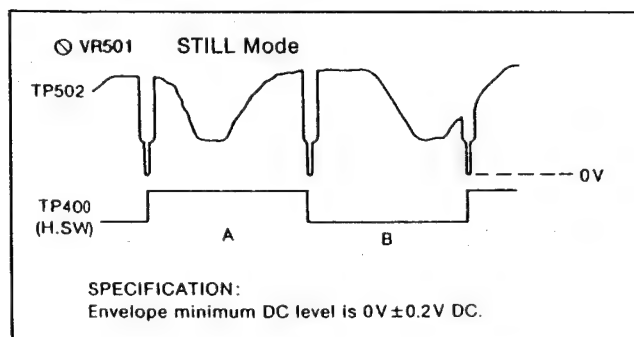
Set the [PATTERN] to "FIX".

SEARCH = CENTER

PATTERN = FIX

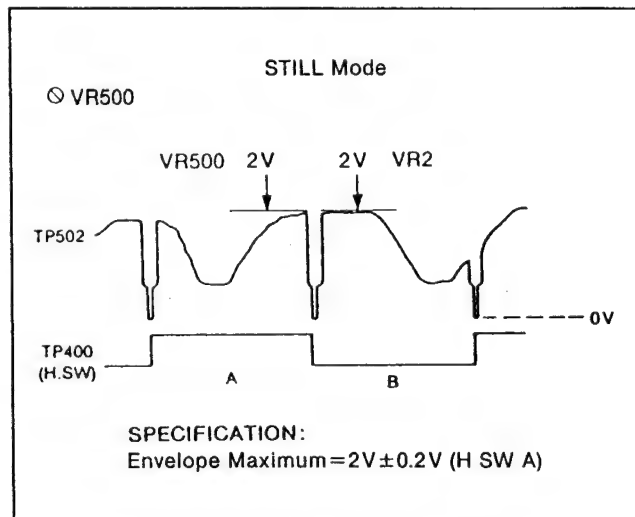
<STEP 2>

- SCOPE CH1 : TP502
SCOPE CH2 : TP400
- SCOPE SETTING : 1V/DC
SCOPE CH2 : 5V
- SCOPE MODE : CHOP
BW
- SCOPE TRIG : CH2
- SCOPE SWEEP : 2ms
- Place the unit in the STILL mode.
- Adjust VR501 so that the minimum signal level is $0V \pm 0.2V$ as shown in Figure.

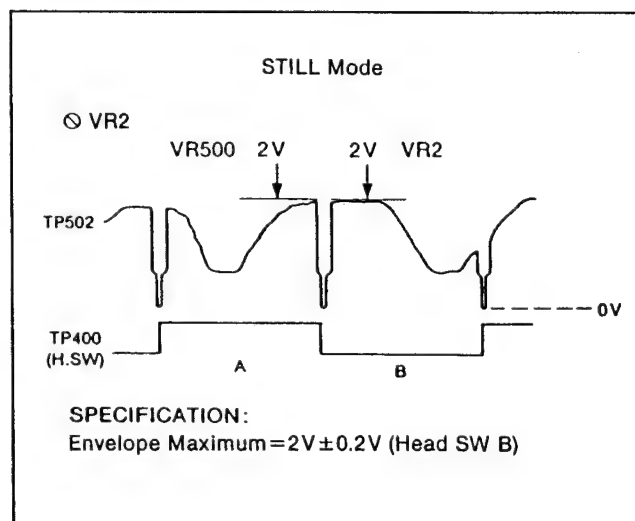


<STEP 3>

- SCOPE CH1 : TP502
SCOPE CH2 : TP400
- Rotate capstan shaft by hand (CCW) and set the Envelope becomes maximum during Head Switch A portion.
- Adjust VR500 (ENV GAIN) so that the maximum envelope level is $2V \pm 0.2V$.



- Rotate capstan shaft by hand (CCW) and set the Envelope becomes maximum during Head switch B portion.
- Adjust VR2 (A/B GAIN BAL) so that the maximum envelope is $2V \pm 0.2V$.
- After adjustment set the AT HEIGHT is 0.
- After this adjustment, item 8-1 ENVELOPE DETECTION ADJUSTMENT is required.



5-5. EQUALIZATION ADJUSTMENT (1)

(S1 : REC/PLAY CH0)
(S2 : REC/PLAY CH1)

Factory Preset only, skip this item after Head Replacement.

SPEC	
TEST	TP8[E2], VIDEO OUT, TP400[F4]
MODE	VAR (× 1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	See Below

5000 SERIES

<STEP 1>

Adjustment VR.

- (1) VR3 (PHASE SHIFT) -----6 division
- (2) VR609 (MAG A) -----7 division
VR608 (MAG B) -----7 division
- (3) VR613 (AFC HA) -----5 division
VR612 (AFC HB) -----5 division
- (4) VR611 (AFC MA) -----2 division
VR610 (AFC MB) -----2 division

<STEP 2>

1. Set the spectrum analyzer to REG 4 mode.

REG 4 mode

ITEM PARAMETER

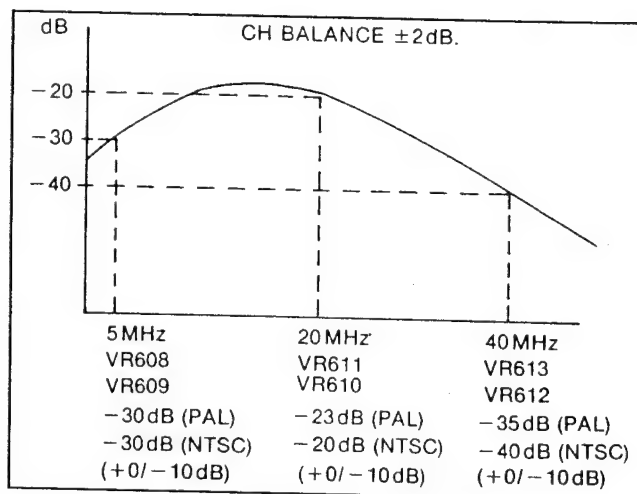
- | | |
|---------------------|---------------|
| (1) REF LEVEL | -10.0dBm |
| (2) ATTEN | 10dB |
| (3) DIV (dB/DIV) | 5dB/div |
| (4) START FREQUENCY | 0MHz |
| (5) STOP FREQUENCY | 50MHz |
| (6) RES BW | 1MHz |
| (7) VIDEO BW | 3kHz |
| (8) SWEEP TIME | 300msec |
| (9) TRIGGER | EXT (HEAD SW) |
| (10) VID AVG | 10 |

<STEP 3>

EQUALIZER COARSE ADJUSTMENT

1. Connect the spectrum analyzer to TP8.
2. Connect the EXT trigger input of the spectrum analyzer to TP400 (HEAD SW).
3. Adjust VR609 (MAG A) and VR608 (MAG B) so that the gain is -30dB +0/-10dB at 5MHz portion.
4. Adjust VR613 (AFC HA) and VR612 (AFC HB) so that the gain is -35dB +0/-10dB at 40MHz portion.
5. Adjust VR611 (AFC MA) and VR610 (AFC MB) so that the gain is -23dB +0/-10dB at 20MHz portion.

Note: If still out of specification.
Just adjust as A curve as shown in Figure.
And then carry on next the adjustment.



5-6. EQUALIZATION ADJUSTMENT (2)

(S1 : REC/PLAY CH0)
(S2 : REC/PLAY CH1)

SPEC	MINIMUM ERROR RATE
TEST	TV MONITOR, FRONT ERROR DISPLAY
MODE	VAR (× 1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	VR611 (AFC MA)[F1], VR610 (AFC MB)[F1], VR613 (AFC HA)[E1], VR612 (AFC HB)[E1], VR10 (COMP BIAS LEVEL)[F1], VC301 (PHASE ADJ)[A2], VC1 (RESON A)[G2], VC2 (RESON B)[G2], VR3 (PHASE SHIFT)[I2] VR608(MAG B), VR609(MAG A)[D1], VR11 (AUTO EQ IN LEVEL)[E1] VR12 (AFC MATCH)[F4]

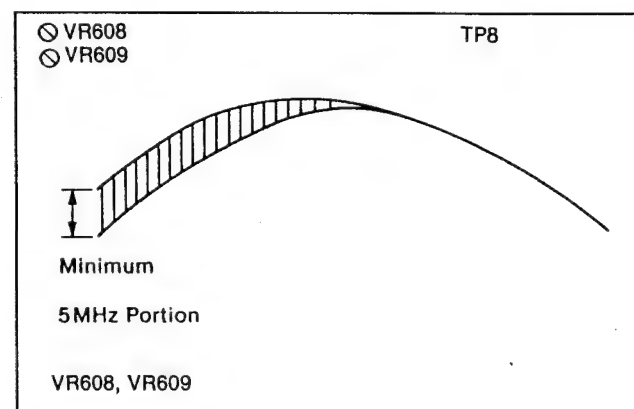
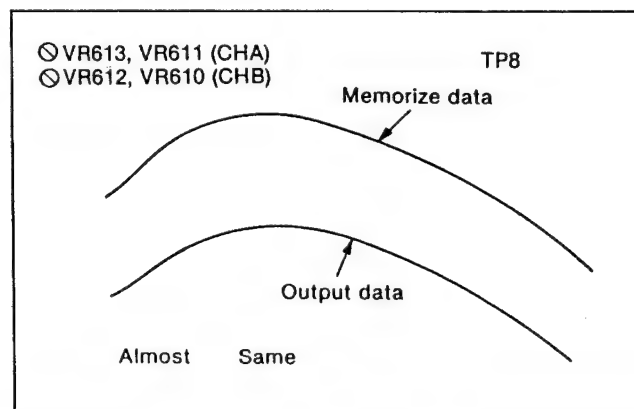
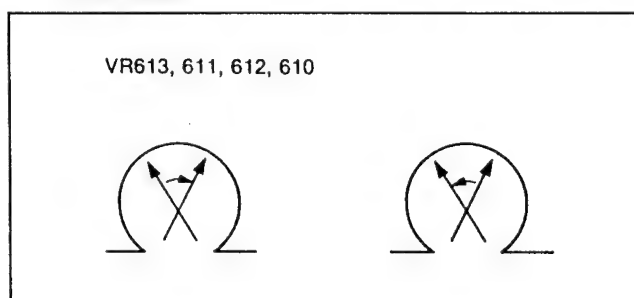
5000 SERIES

[RF SECTION]

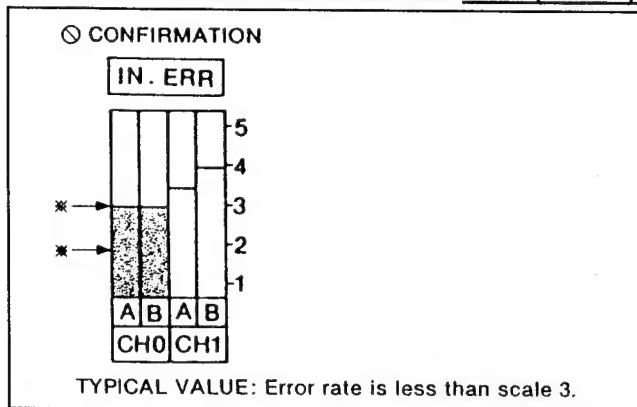
<STEP 1>

1. Use the "75% Color Bars Shuffle OFF" tape.
2. Search = "CENTER"
Maximize the envelope bar graphs on the front panel by adjusting the AT heights in the SUPER USER Menu.
3. Choose "PB mode : ch0" on the SUPER USER MENU when adjusting the Equalizer CH0 board, and "PB mode : ch1" for the CH1 board at the same time video output picture must be stable.
4. Center VC1/VC2.
5. Use VR3/VR10/VC301 to minimize errors (speckling) on the picture monitor. Continue adjusting these three pots until no further improvement is possible.
6. Use VC1, VC2 & VR3 to further reduce the errors.
7. Use VC1, VC2 & VR10 in the same manner.
8. Adjust VC301 to minimize screen errors and adjust VR12 to minimize screen errors.
9. Change the ECC Sample on the TEST/RF Menu to fast
10. Memorize the spectrum waveform on TP8 into the "B" memory of the HP8591A Spectrum Analyzer.
11. Next adjust VR613 & 611 to reduce the error rate further. Turn VR613 very slightly in the direction which reduces the INNER ERROR RATE in the "CH0 A" bar graph. Then adjust VR611 very slightly in the opposite direction CCW to reduce the error further. Continue this alternate adjustment of the pots until no more improvement is possible.
12. Repeat this same adjustment technique starting with VR612 and following with VR610, in order to minimize the INNER ERROR RATE on the "CH0 B" bar graph.

13. Recall the previously memorized waveform in the Spectrum Analyzer "B" memory, and compare it to the waveform now present on TP8. If the two waveforms aren't similar in appearance, adjust the two pairs of pots 613/611 (CHA) & 612/610 (CHB) in the manner described above, for minimum error rate for both heads, and similar spectrum waveshapes.
14. Adjust VR608 & 609 to minimize the "sawtooth" appearance of the spectrum waveform at the 5Mhz end.
15. Adjust VR10 & VC301 to further reduce the Inner Error Rate.



16. Confirm the error rate is less than 10^{-4} (scale 3).



Note: After equalization adjustment, RF envelope output level adjustment is required as follows.

1. Connect the scope to TP8 and place the unit in PLAY mode.
2. Adjust VR608 and VR609 so that the output envelope is 400mVp-p. (50Ω terminated).
3. Connect the scope to WFM out and adjust VR11 so that the output envelope is 200mVp-p (75Ω terminated).

5-7. WFM OUT CONFIRMATION (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	EYE : 200mV ± 50mV
TEST	WFM OUT
MODE	VAR × 1
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR11 (AUTO EQ IN LEVEL)[E1]

<STEP 1>

1. Connect the scope to VFM OUT on the rear panel through 75Ω termination.
2. Set the Front Menu to WFM ENV mode.
3. Confirm the ENVELOPE level is 900mV ± 200mV.
4. Set the Front Menu to WFM EYE mode.
5. Adjust VR11 (AUTO EQ IN LEVEL) so that the level is 200mV ± 500mV.

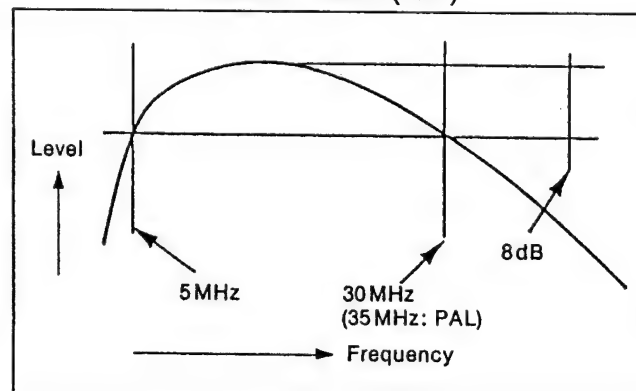
FINAL CONFIRMATION

SPEC	Refer to figure
TEST	TP8 [E2], TP400 [f4]
MODE	VAR × 1
TAPE	SHUFFLING OFF 75% COLOR BAR
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	VR3, VR610, VR611, VR612, VR613, VC1,

1. Set the spectrum analyzer as shown in item 5-5.
2. Connect the spectrum analyzer to TP8.
3. Connect the EXT input of spectrum analyzer to TP400.
4. Confirm that the output spectrum is as shown in figure.
5. If it is not, readjust VR3, VC1, VC2 (PHASE), VR610, VR612, VR611 and VR613 (LEVEL).

$$5\text{MHz} = 30\text{MHz} \pm 2\text{MHz (NTSC)}$$

$$35\text{MHz} \pm 2\text{MHz (PAL)}$$



7. CUE AUDIO (S3) BOARD MODE CONDITION

Set the Switches on the AUDIO IN. OUT P.C.B. and set the MENU condition.

INPUT ATT SELECT SW 4dBm (on the AUDIO IN/OUT Board)
 OUTPUT ATT SELECT SW ... 0dBu (on the AUDIO IN/OUT Board)
 INPUT IMPEDANCE SW HIGH (on the AUDIO IN/OUT Board)

MENU CONDITION

AUDIO IN MENU

Select the CUE AUDIO LEVEL
 to "UNITY" : F5

AUDIO OUT MENU

Select the CUE AUDIO LEVEL
 to "UNITY" : F5

7-1. MASTER OSC DRIVE VOLTAGE ADJUSTMENT (S3 : CUE AUDIO)

SPEC	21V \pm 0.1V DC
TEST	TP1[I5]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1 (21V ADJ.)(I4)

<STEP 1>

- SCOPE : TP1
- Place the unit in the RECPLAY mode.
- Adjust VR1 so that the DC voltage is 21V \pm 0.1V DC.

7-2. MASTER OSC ADJUSTMENT (S3 : CUE AUDIO)

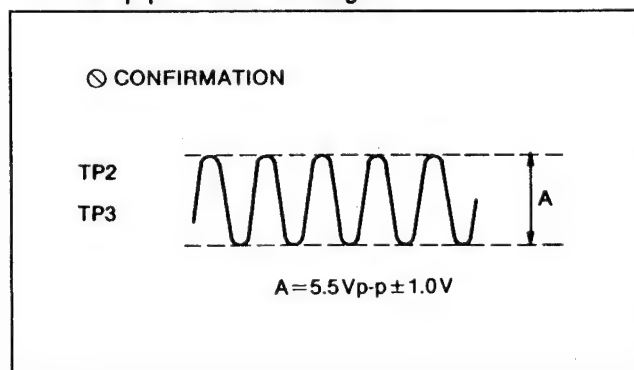
SPEC	TP2 = 70kHz \pm 0.2kHz, 5.5Vpp \pm 1.0V TP3 = 5.5Vpp \pm 1.0V
TEST	TP2[H2], TP3[G2]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	FREQUENCY COUNTER, OSCILLOSCOPE
INPUT	
ADJ.	T1[H2], T1 on S3 SUB2

<STEP 1>

- FREQUENCY COUNTER : TP2
- Place the unit in the RECPLAY mode.
- Adjust T1 so that the OSC frequency is 70kHz \pm 0.2kHz.

<STEP 2>

- SCOPE CH1 : TP2
CH2 : TP3
- Place the unit in the RECPLAY mode.
- Confirm that the OSC frequency level A is 5.5 \pm 1.0V p-p as shown in Figure.



<STEP 3>

- Scope CH1 : PIN 6 of S3 SUB2
- Adjust T1 on S3 SUB2 so that the OSC level becomes maximum.

<STEP 4>

- SCOPE CH1 : PIN 6 of S3 SUB2
CH2 : PIN 7 of S3 SUB2
- Confirm the OSC level is 5.5Vpp \pm 1V.
- Confirm the frequency is 140 kHz \pm 5kHz.

7-3. FULL ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

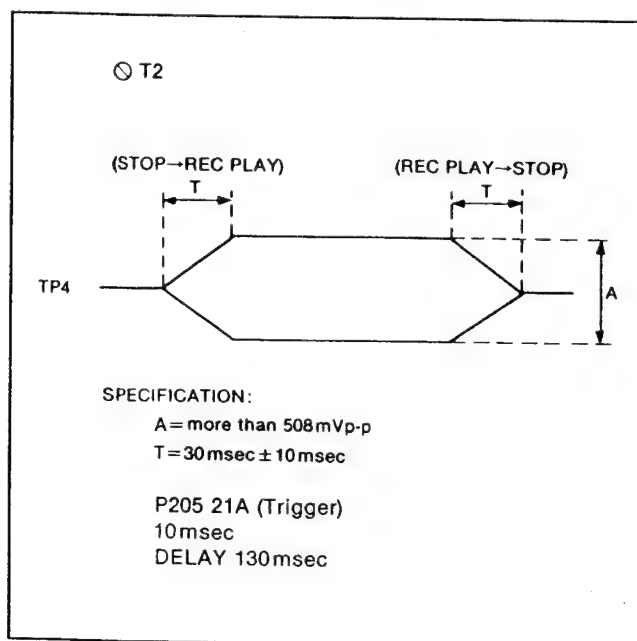
SPEC	TP4:more than 508mVp-p,T=30msec±10msec
TEST	TP4[H1], P205 21A --- Trigger
MODE	RECPLOY, RECPLOY ↔ STOP
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE (STORAGE)
INPUT	
ADJ.	T2[I1]

<STEP 1>

1. SCOPE : CH1 : TP4
CH2 : 21A of P205 --- Trigger
2. Place the unit in RECPLOY mode.
3. Adjust T2 so that the signal level A is maximum.
4. Confirm that level A is more than 508mVp-p.

<STEP 2>

1. Place the unit moving to RECPLOY from STOP mode and moving to STOP from RECPLOY mode.
2. Confirm that the rising and falling period of the waveform is 30ms ± 10ms as shown in Figure.



7-4. CUE ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

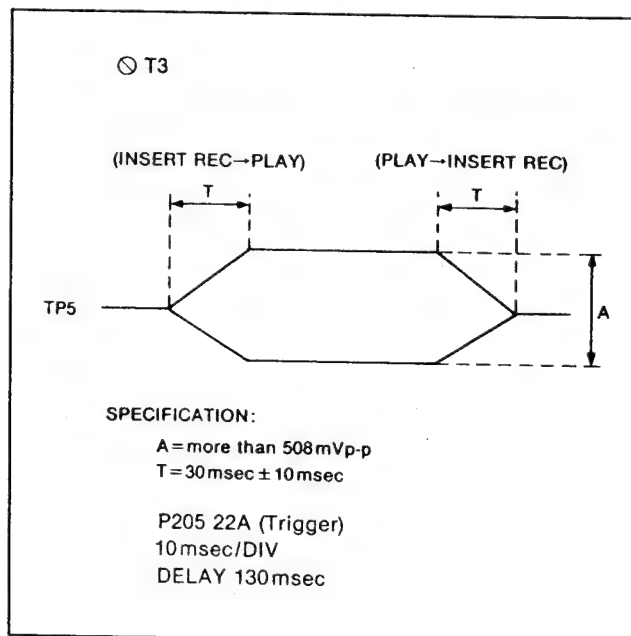
SPEC	TP5:more than 508mVpp, T=30msec±10msec
TEST	TP5[G2], P205 22A --- Trigger
MODE	INSERT REC ↔ PLAY (CUE ON)
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T3[G1]

<STEP 1>

1. SCOPE : CH1 : TP5
CH2 : 22A of P205 --- Trigger
2. Place the unit in INSERT CUE REC mode.
3. Adjust T3 so that the signal level A is maximum.
4. Confirm that it level A is more than 508mVp-p as shown in Figure.

<STEP 2>

1. Place the unit moving to INSERT REC from play and moving to play from INSERT REC mode.
2. Confirm that the rising and falling period of the waveform is 30ms ± 10ms as shown in Figure.



7-5. T/C ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP6:more than 508mVpp, T=30msec±10msec
TEST	TP6 (T/C ERASE)[F2], P205 22B --- Trigger
MODE	INSERT REC, ASSEMBLE REC ASSEMBLE REC ↔ PLAY
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T4 (T/C ERASE)[F1]

<STEP 1>

MENU CONDITION

MAN - EDIT MENU INSERT "ON"
Select the TC F10 to "ON".

<STEP 2>

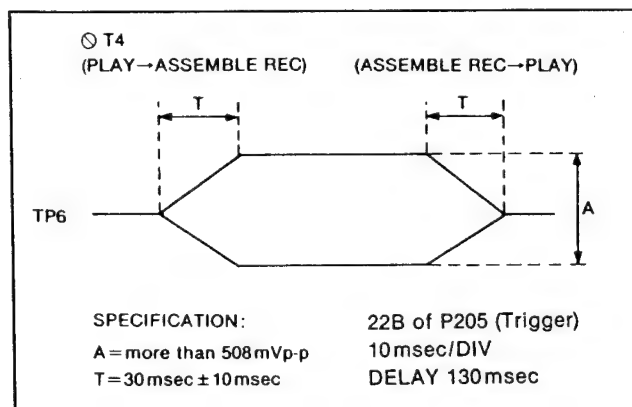
- SCOPE : CH1 : TP6
CH2 : P205 of 22B --- Trigger
- Place the unit in INSERT REC mode.
- Adjust T4 so that the signal level A is maximum.
- Confirm that it level A is more than 508mVp-p as shown in Figure.

<STEP 3>

- Place the unit in ASSEMBLE RECORDING mode.
- Confirm that the signal level A is more than 508mVp-p.
- If it is not, Adjust T4 so that the level A is more than 508mVp-p as shown in Figure.

<STEP 4>

- Place the unit moving in ASSEMBLE RECORDING mode from PLAYBACK mode and moving in PLAYBACK from ASSEMBLE RECORDING mode.
- Confirm that the rising and falling period of the waveform is 30msec ± 10msec as shown in Figure.



7-6. CTL ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP7=more than 508mVpp,T=30msec±10msec
TEST	TP7[D2], P205 22C --- Trigger
MODE	ASSEMBLE REC to PLAY, PLAY to ASSEMBLE REC
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T5[D1]

<STEP 1>

MENU CONDITION

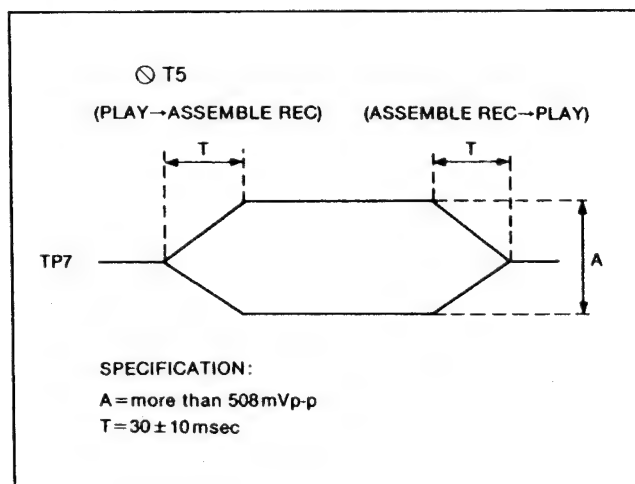
MAN - EDIT MENU ASSEMBLE

<STEP 2>

- SCOPE : CH1 : TP7
CH2 : P205 of 22C --- Trigger
- Place the unit in ASSEMBLE REC mode.
- Adjust T5 so that the signal level A is maximum.
- Confirm that level A is more than 508mVp-p as shown in Figure.

<STEP 3>

- Place the unit in ASSEMBLE RECORDING mode from PLAYBACK mode and moving in PLAYBACK from ASSEMBLE RECORDING mode.
- Confirm that the rising and falling period of the waveform is 30 ± 10msec as shown in Figure.



7-7. T/C BIAS & SIGNAL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP8 BIAS CURRENT A = $62\text{mVpp} \pm 3\text{mV}$ SIGNAL CURRENT B = $5\text{mVpp} \pm 0.2\text{mV}$
TEST	TP8[I3], TP10[H4], TP11[I4]
MODE	ASSEMBLE REC
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE, PROBE 1:1
INPUT	
ADJ.	T6[I2], VR2 (T/C BIAS CURRENT)[I3] VR4 (T/C SIGNAL CURRENT)[G4]

<STEP 1>

MENU CONDITION

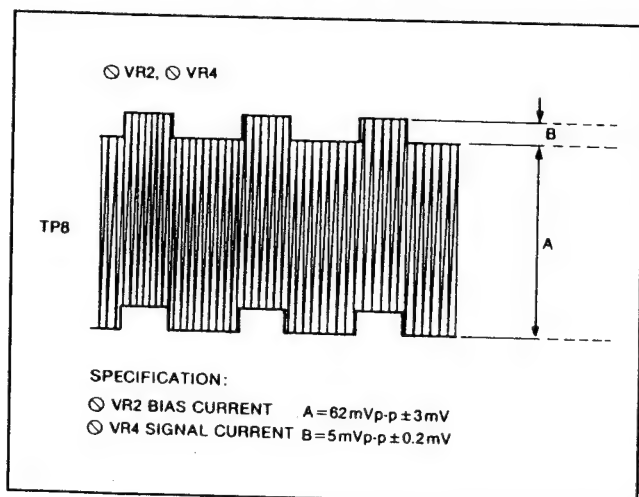
MAN - EDIT MENU ASSEMBLE

<STEP 2>

1. SCOPE : TP8
2. Place the unit in ASSEMBLE REC mode.
3. Adjust T6 so that the signal level A is maximum.

<STEP 3>

1. SCOPE : TP10, TP11 (probe GND)
2. Place the unit in ASSEMBLE REC mode.
3. Adjust VR2 so that the BIAS CURRENT LEVEL A is $62\text{mVpp} \pm 3\text{mV}$ as shown in Figure.
4. Adjust VR4 so that the SIGNAL CURRENT LEVEL B is $5\text{mVpp} \pm 0.2\text{mV}$ as shown in Figure.



7-8. CUE BIAS CURRENT ADJUSTMENT (1)(S3 : CUE AUDIO)

SPEC	TP9 : MAXIMUM, CUE OUT : MAXIMUM
TEST	TP9[F3], CUE OUT
MODE	REC PLAY, REC PLAY ↔ PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	1kHz +4dBm Sinewave signal to CUE IN
ADJ.	T7[F3], VR3 (CUE BIAS CURR.)(G3)

<STEP 1>

1. SCOPE : TP9
2. Place the unit in REC PLAY mode.
3. Adjust T7 so that the signal level is maximum.

T7 Signal Level = maximum

<STEP 2>

1. SCOPE : CUE OUT
2. Place the unit repeat moving in REC PLAY from PLAYBACK and in PLAYBACK from REC PLAY mode.
3. Adjust VR3 so that the signal level is maximum.

7-9. EE LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP13:-12dBm \pm 0.2dB, CUE OUT:4dBm \pm 0.2dB
TEST	TP13[B3], CUE OUT
MODE	EE (EJECT)
TAPE	
M.EQ	VTVM
INPUT	1kHz 4dBm Analog Sinewave signal to CUE IN
ADJ.	VR6 (EE LEVEL)[B3], VR7 (EE OUT LEVEL)[A3]

4000 SERIES

<STEP 1>

MACHINE CONDITION

IN/OUT ATT SW (on Audio IN/OUT P.C.B) : +4dBm

INPUT IMPEDANCE : 600 Ω

AUDIO IN MENU : UNITY

<STEP 2>

VTVM : TP13

Adjustment VR : VR6

SPECIFICATION : -12dBm \pm 0.2dB

<STEP 3>

VTVM : CUE OUT

Adjustment : VR7

SPECIFICATION : 0dBu \pm 0.2dB

7-10. PLAYBACK EQUALIZER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	50Hz~1kHz = -3dB~+1.5dB 1kHz~15kHz = 1.0dB, 1kHz 0dB Reference
TEST	TP16 [C3]
MODE	PLAY
TAPE	AUDIO FREQUENCY RESPONSE ALIGNMENT TAPE
M.EQ	VTVM
INPUT	
ADJ.	VR10 (PB EQ)[C1]

<STEP 1>

1. VTVM : TP16

2. Play back the Alignment Tape.

3. Adjust VR10 so that the Playback level is within the specification as shown.

SPECIFICATION:

50Hz ~ 1kHz = -3dB ~ +1.5dB

1kHz ~ 15kHz = \pm 1.0dB

(1kHz 0dB Reference)

7-11. PLAYBACK LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP16 = -12dB±0.2dB, CUE OUT:0dBu± 0.2dB
TEST	TP16[C3], CUE OUT
MODE	PLAY
TAPE	ALIGNMENT TAPE 1KHz 0VU PORTION
M.EQ	VTVM
INPUT	
ADJ.	VR11 (PB LEVEL)[B2], VR12 (PB OUT LEVEL)[C3]

<MACHINE CONDITION>

1. Output ATT : 4dBm
2. Audio out Cue : UNITY (MENU)

<STEP 1>

1. VTVM : TP16
2. Playback the Audio Level Alignment Tape.
3. Adjustment VR : VR11

SPECIFICATION : -12dBm ± 0.2dB

<STEP 2>

1. VTVM : CUE OUT
2. Playback the Audio Level Alignment Tape.
3. Adjustment VR : VR12

SPECIFICATION : 4dBm ± 0.2dB

7-12. CUE BIAS CURRENT ADJUSTMENT (2)(S3 : CUE AUDIO)

SPEC	TP16:-12dBm ± 0.2dB, CUE OUT AUDIO DISTORTION IS LESS THAN 3%
TEST	TP16[C3], CUE OUT
MODE	REC PLAY ↔ PLAY
TAPE	BLANK TAPE
M.EQ	VTVM DISTORTION METER
INPUT	1kHz +4dBm, 1kHz +12dBm
ADJ.	VR8[A2]

<STEP 1>

1. VTVM : TP16
2. Supply a 1kHz +4dBm sine wave signal to CUE IN and Record.
3. Playback a just recorded portion.
4. Adjust VR8 so that the CUE BIAS CURRENT LEVEL is -12dBm ± 0.2dB.

TP16

SPECIFICATION: VR8 : -12dBm ± 0.2dB

<STEP 2>

1. DISTORTION METER : CUE OUT
2. Supply a 1kHz +12dBm sinewave signal to CUE IN and Recorded.
3. Playback a just recorded portion.
4. Confirm that the distortion is less than 3%.
5. If it is not adjust VR3 as follow as item 7-11. CUE BIAS CURRENT ADJUSTMENT (1) <STEP 2>.

CUE OUT

SPECIFICATION: AUDIO DISTORTION : less than 3%

7-13. REC EQUALIZER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	50Hz~1kHz = -3dB~+1.5dB 1kHz~15kHz = 1.0dB (1kHz 0dB Reference)
TEST	CUE OUT
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	VTVM
INPUT	-6dBm, SWEEP
ADJ.	VR14 (REC EQ 2)[B2], FL4[A2], VR9[A2]

<STEP 1>

1. VTVM : CUE OUT
2. Supply a difference frequency sinewave as shown below and record.
3. Playback a just recorded portion.
4. Adjust VR14, FL4 and VR9 so that the Playback level is within the specification.

INPUT LEVEL: -6dBm 1kHz (Reference)
-6dBm SWEEP as shown below

SPECIFICATION: 50Hz ~ 1kHz = -3dB ~ +1.5dB
1kHz ~ 15kHz = ± 1.0dB
(1kHz -6dBm Reference)

Adjustable frequency

VR14 and FL4 : 5kHz ~ 12.5kHz
VR9 : 12.5kHz ~ 15kHz

7-14. RECORDING LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP16 : -12dBm ± 0.2dB
TEST	TP16[C3]
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	VTVM
INPUT	1kHz 4dBm Sinewave Signal to CUE IN
ADJ.	VR8[A2]

<STEP 1>

1. VTVM : TP16
2. Supply a 1kHz 4dBm sinewave signal to CUE IN and Record it.
3. Playback a just recorded portion.
4. Adjust VR8 so that the level is -12dBm ± 0.2dB.

SPECIFICATION: -12dBm ± 0.2dB

7-15. CUE METER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	CUE METER -20dB
TEST	CUE METER
MODE	EJECT
TAPE	
M.EQ	
INPUT	1kHz 4dBm Sinewave Signal to CUE IN
ADJ.	VR13[C4]

<STEP 1>

Note: Before this adjustment, CUE METER OFFSET (item 12-3) is required.

1. Supply a 1kHz 4dBm sinewave signal to CUE IN.
2. Adjust VR13 so that the meter level is -20dB.

7-16. CUE MIX ADJUSTMENT (S3 : CUE AUDIO)

SPEC	+4dBm±0.5dBm(NTSC)
TEST	CUE OUT
MODE	EJECT
TAPE	
M.EQ	
INPUT	1kHz 4dBm Sinewave Signal to CUE IN
ADJ.	VR5[B4]

<STEP 1>

1. Supply a 1kHz 0dBu sinewave signal to CUE IN.
2. Set the VTR in to the CUE DMIX mode as shown below.

AUDIO IN → SET UP → CH MIX ON →
(CURSOR CENTER) → set the CH-1 S

3. Adjust VR5 so that the cue output level is 4dBm ± 0.5dBm.

8. AT (S4) BOARD

MACHINE CONDITION

1. Disconnect the P523 on the H.A. REGULATOR (S) P.C.B. which is located at right side of the Mechanism. while adjustment 8-1 through 8-6.
Connect P523 from adjustment 8-7.

MENU CONDITION

TEST MENU



AT SERVO TEST MENU

Set the each functions as follow.

1. F4: SEARCH = "CENTER"
2. F5: PATTERN = "ENABLE"
3. F8: AT HEIGHT = Ach "0"
Bch "0"
4. SW2601 [D2] on S4 board is OPEN.
5. Error correction switches on L3 board are all OFF.
6. Error concealment switch on L4 board is OFF.

8-1. ENVELOPE DETECTION ADJUSTMENT (S4 : AT)

SPEC	0.7V \pm 0.1VDC, PEAK = +3V \pm 0.1VDC
TEST	TP2611 (ENV CH1)[D1], TP2612 (ENV
MODE	STOP, EJECT, SW2601=OPEN, P523=OFF SEARCH = CENTER, PATTERN = ENEBLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2601[F2], VR2603[D4], VR2602[F2], VR2604[E4]

<STEP 1>

MENU CONDITION

Refer to the Machine Condition and Menu Condition at the beginning of this SECTION. P523 = OFF

<STEP 2>

1. SCOPE : CH1 TP2611
SCOPE : CH2 TP2612
2. Set the VTR in EJECT mode.
3. Adjust VR2601 and VR2602 so that the level of waveform is 0.7V \pm 0.1 V DC.

<STEP 3>

1. SCOPE : CH1 TP2611
SCOPE : CH2 TP2612
2. Set the VTR in STOP mode.
3. Rotate the capstan shaft by hand, and set the waveform peak becomes maximum.
4. Adjust VR2603 and VR2604 so that the level of waveform is 3V \pm 0.1V DC.
5. Note that VR2601/VR2602/VR2603/VR2604 effect each other.
Repeat step 2 and 3 and confirm that each adjustment is in specification.

⊙ VR2601, ⊙ VR2602

EJECT mode

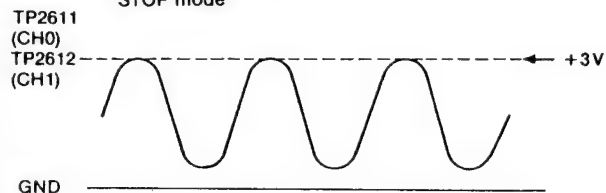
TP2611, TP2612



SPECIFICATION: A = 0.7V \pm 0.1V DC

⊙ VR2603, ⊙ VR2604

STOP mode



SPECIFICATION: PEAK = +3V \pm 0.1V DC

8-2. CONFIRMATION OF GROUP DELAY COMPENSATION CIRCUIT (S4: AT)

SPEC	REFER TO FIGURE
TEST	TP2621[H3]
MODE	VAR (X-1, STILL, X1, X2, X3), SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>

MACHINE CONDITION

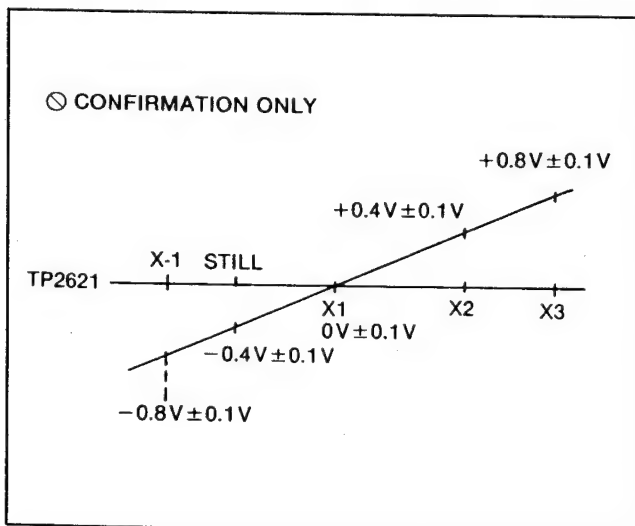
Refer to the Machine condition and Menu condition at the beginning of this section.

<STEP 2>

Connect the scope to TP2621

<STEP 3>

Set the VTR VAR X-1, STILL, X1, X2 and X3 and confirm the each DC voltage is shown below.



<STEP 4>

The DC level of VAR X3 mode should be stable more than 20 sec.

8-3. D/A CONVERTER FULL SCALE ADJUSTMENT (S4 : AT)

SPEC	5.0V ± 0.1VDC
TEST	TP2606 [B1], TP2607 [B2]
MODE	EJECT SW2601-OPEN, P523-OFF, SEARCH-CENTER, PATTERN-FIX
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2613 (DA1FS)[B2], VR2614 (DA2FS)[B2]

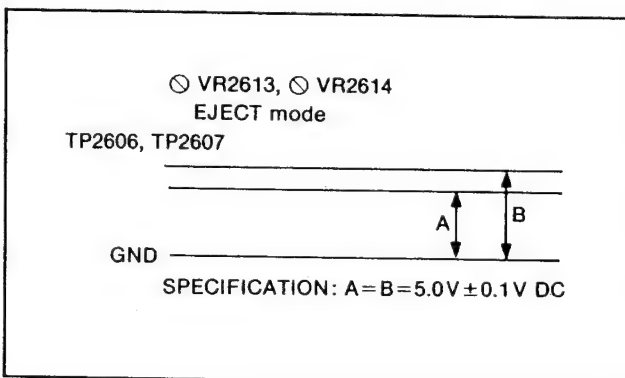
<STEP 1>

MACHINE CONDITION

- Set the VTR in EJECT mode.
- Set the AT mode to SEARCH = CENTER and PATTERN = FIX in the AT TEST Menu.

<STEP 2>

- SCOPE CH1 : TP2606
SCOPE CH2 : TP2607
- Adjust VR2613 and VR2614 so that the voltage at TP2606 and TP2607 are +5V ± 0.1V DC.
- Adjust VR2613 and VR2614 so that the difference voltage between TP2606 and TP2607 are within 0.05V. If the both voltage at TP2606 and TP2607 are 5.0V DC, then it is OK. If the one of the voltage is 4.9V adjust the other level is same level.
- Note that the VR2613 and VR2614 effect each other.



8-4. D/A CONVERTER OFFSET ADJUSTMENT (S4 : AT)

SPEC	TP2606 = TP2607 = 0V \pm 0.05V DC
TEST	TP2606[B1], TP2607[B2], TP2623[D1], TP2624[E1], TP2619[E1] ... TRIGGER
MODE	VAR X1, SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = FIX
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2615 (DA10S)[B2], VR2616 (DA20S)[B2]

<STEP 1>

MACHINE CONDITION

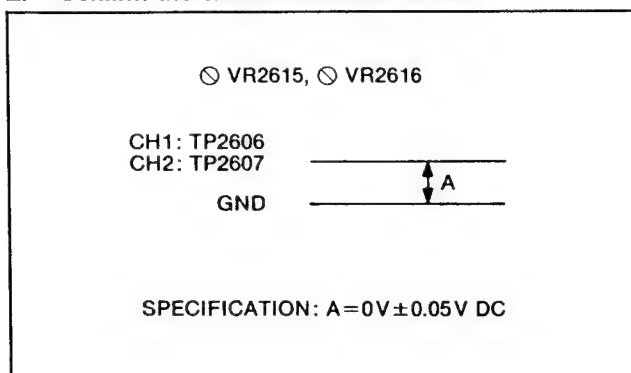
1. Set the AT mode to SEARCH = CENTER and PATTERN = FIX in the AT TEST Menu.
2. Set the VTR in VAR X1 mode.

<STEP 2>

1. SCOPE CH1 : TP2606
CH2 : TP2607
2. Adjust VR2615 and VR2616 so that their voltage are 0V \pm 0.05V DC.

<STEP 3>

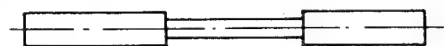
1. SCOPE CH1 : TP2623
CH2 : TP2624
2. Confirm the waveform center is flat.



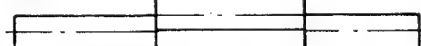
⊙ CONFIRMATION

TP2623
TP2624

<OK>



<NG>



8-5. OPEN GAIN ADJUSTMENT (S4 : AT)

SPEC	TP2627= TP2628 = 3.3Vpp \pm 0.2Vp-p
TEST	TP2627[I1], TP2628[I1]
MODE	VAR, SPEED : FRAME STILL, SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2607[F1], VR2608[G1]

<STEP 1>

MACHINE CONDITION

<STEP 2>

MENU CONDITION

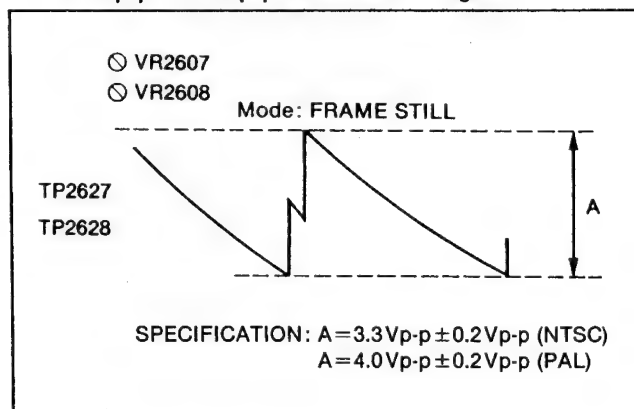
Refer to the Machine Condition and Menu Condition at the beginning of this SECTION.

<STEP 3>

1. SCOPE : TP2627
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2607 so that the waveform level A is 3.3Vp-p \pm 0.2Vp-p as shown in Figure.

<STEP 4>

1. SCOPE : TP2628
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2608 so that the waveform level A is 3.3Vp-p \pm 0.2Vp-p as shown in Figure.



8-6. DRIVE WAVEFORM CONFIRMATION (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP5006, TP5007 (HEAD AMP REGURATOR BOARD)
MODE	VAR X3, VAR X-1, SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>

MACHINE CONDITION

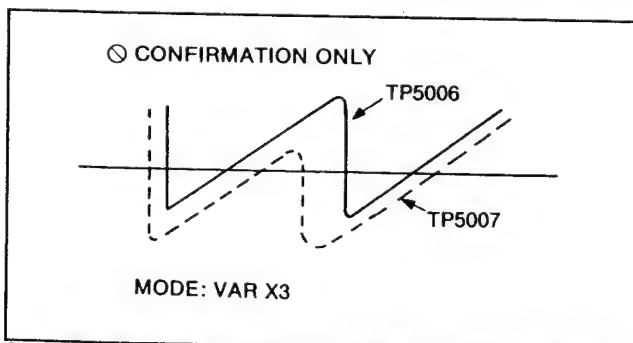
Set the Machine condition as shown in the first page of this section.

<STEP 2>

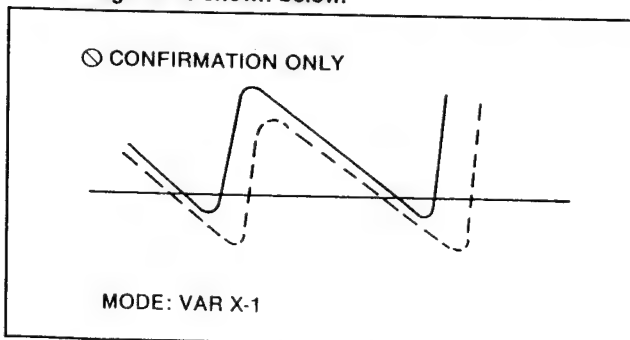
- SCOPE CH1 : TP5006
CH2 : TP5007 on H.A.REGURATOR BOARD

The H.A.REGURATOR BOARD is located at right side of mechanism.

- Set the VTR in VAR X3 mode and confirm the drive voltage is as shown below.



- Set the VTR in VAR X-1 mode and confirm the drive voltage is as shown below.



- Turns power off and connect P523.

8-7. STRAIN SENSOR OUTPUT ADJUSTMENT (A CH)(S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2627[I1], TP2629[G1] TP2619[E1] ... TRIGGER
MODE	VAR FIELD STILL, SW2601=OPEN,P523=ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE (DC mode)
INPUT	
ADJ.	VR2609 (STR OS A)[G1]

<STEP 1>

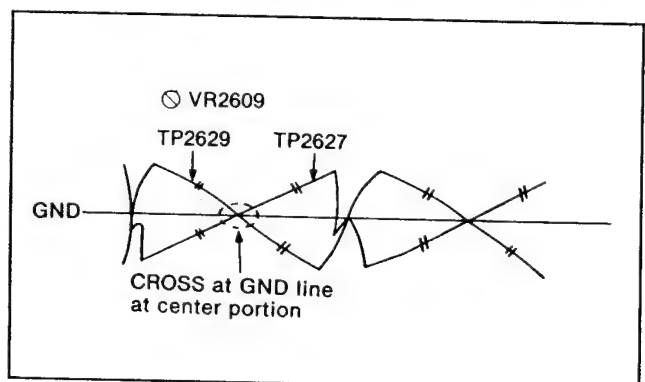
- Confirm the P523 is connected.
- Set the AT mode SEARCH = CENTER and PATTERN = ENEBLE by AT TEST Menu.

<STEP 2>

- Press VAR button and set the speed to STILL (FIELD STILL).
- SCOPE CH1 : TP2627
CH2 : TP2629
TRIGGER : TP2619

<STEP 3>

- Rotate the capstan shaft by hand and set the waveform of TP2627 crosses to GND at center of the slope.
- Adjust VR2609 so that the TP2629 and TP2627 waveform crosses to GND at their center of the waveform.



8-8. STRAIN SENSOR OUTPUT ADJUSTMENT (B CH)(S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2628[H1], TP2630[H1] TP2619[E1] ... TRIGGER
MODE	VAR FIELD STILL, SW2601=OPEN, P523=ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE (DC mode)
INPUT	
ADJ.	VR2610 (STR OS B)[H1]

<STEP 1>

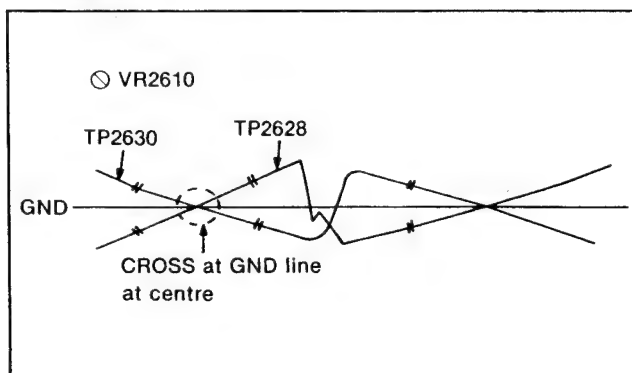
1. Confirm the P523 is connected.
2. Set the AT mode SEARCH = CENTER and PATTERN = ENEBLE by AT TEST Menu.

<STEP 2>

1. Press VAR button and set the speed to STILL (FIELD STILL).
2. SCOPE CH1 : TP2628
CH2 : TP2630
TRIGGER : TP2619

<STEP 3>

1. Rotate the capstan shaft by hand and set the waveform of TP2628 crosses to GND at center of the slope.
2. Adjust VR2610 so that the TP2630 and TP2628 waveform crosses to GND at their center of the waveform.



8-9. STRAIN SENSOR GAIN ADJUSTMENT (S4 : AT)

SPEC	TP2630 = TP2629 = 3.3VPP ± 0.5V
TEST	TP2629[G1], TP2630[H1]
MODE	JOG, SPEED : FRAME STILL, SW2601 = OPEN, P523 = ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2611[G1], VR2612[G1]

Connect P523

<STEP 1>

MENU CONDITION

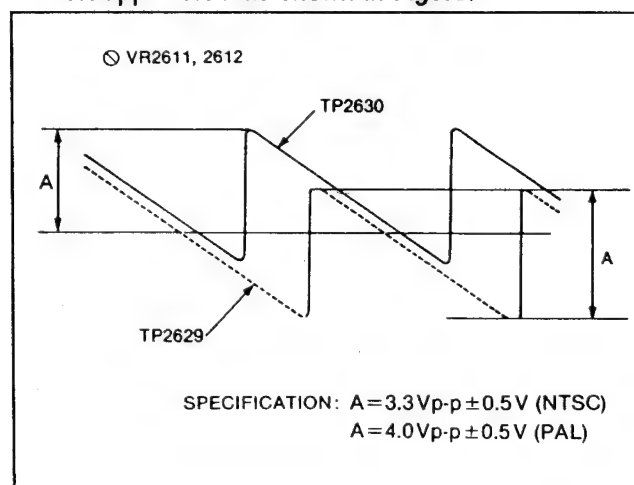
Refer to the Machine Condition and Menu Condition at the beginning of this SECTION. Do not remove P523.

<STEP 2>

1. SCOPE : TP2629
2. Playback a 75% color bar portion of the Alignment Tape in FRAME STILL mode.
3. Adjust VR2611 so that the waveform level A is 3.3Vpp ± 0.5V as shown in Figure.

<STEP 3>

1. SCOPE : TP2630
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2612 so that the waveform level A is 3.3Vpp ± 0.5V as shown in Figure.



8-10. AT HEIGHT (1) ADJUSTMENT (S4 : AT)

SPEC	TP2619 PULSE IS LOCATED As shown in figure.
TEST	TP2610[F1], TP2619[F1], TP5006[C2], TP5007 (H.A REGULATOR S)[C1] TP2606, TP2607
MODE	VAR×1, SW2601=OPEN, P523-ON, SEARCH=CENTER, PATTERN=ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2605[F1], VR2606[F1]

<STEP 1>

SCOPE CH1 : TP2610 Segment Pattern
SCOPE CH2 : TP2619 Pulse
SCOPE CH3 : TP5006 Drive Voltage
SCOPE CH4 : TP5007 Drive Voltage

<STEP 2>

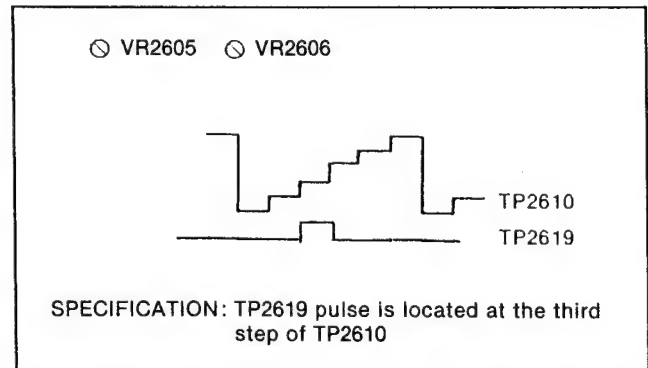
1. Field or Frame Still Option (Setup/Home/AT Play)
2. Center/Enable (Test/Servo/AT)
3. SW2601 open
4. Variable X1 Playback
5. 75% Color Bar Alignment tape, shuffling ON
6. Zero the AT Head Heights from the front panel. (Height ON/ BS with F9/left & right cursors, with the front panel knob).

<STEP 3>

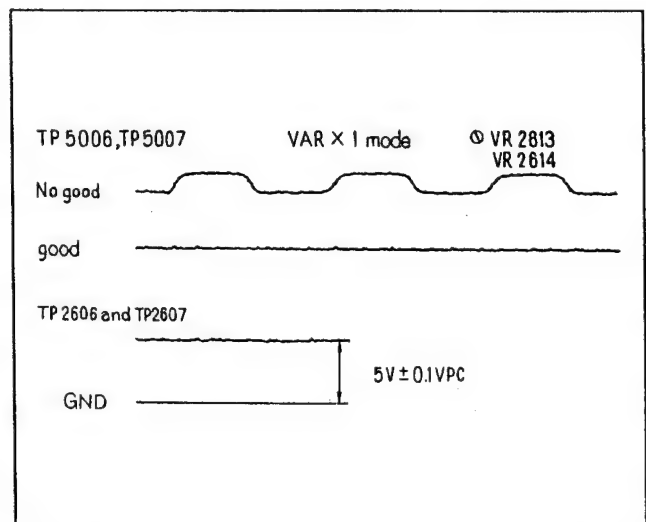
1. Initially, adjust the deflection pattern voltages at TP5006 & 5007 are 0 volts DC by VR2605 & VR2606 during VAR X1 playback. This centers the AT heads.
2. Next, fine adjust these pots to achieve three conditions
 - A). Proper rising staircase and pulse timing at TP2610 & 2619. (The stairs are rising from left to right, there are 6 or 8 steps (for NTSC or PAL), and the pulse is aligned with the highest step.
 - B). Maximum RF on the 4 "Envelope" bar graphs on the Test/Servo/AT screen.
 - C). The segment LED D609 on the AT board should be off.
3. The drive voltage at TP5006 & 5007 will have changed, but they should still be within the range of zero volts, plus or minus fifty volts.
4. Note the voltages at TP5006 & 5007 for use in subsequent adjustments.

Note:

1. In this adjustment if output drive voltage waveforms (TP5006 and TP5007) are not flat like a pulse. VR2613 and VR2614 adjustments are required as shown in Figure.



2. Place the unit in VAR × 1 mode.
3. Adjust VR2613 and VR2614 so that the output waveform are flat as shown in Figure.
4. Confirm that the voltage at TP2606 and TP2607 are +5V ± 0.1VDC. (8-3. D/A CONVERTER FULL SCALE ADJUSTMENT)



8-11. AT HEIGHT (2) ADJUSTMENT (S4 : AT)

SPEC	TP2619 PULSE IS LOCATED AT PEAK OF TP2610
TEST	TP2610[F1], TP2619(TRIGGER)[E1], TP5006[C2], TP5007(H.A REGULATOR S)[C1] TP2629, TP2630
MODE	VAR, SW2601-CLOSE, P523-ON, SEARCH = CENTER, PATTERN= ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2609 (STR OS A)[G1], VR2610 (STR OS B)[H1]

This adjustment will be done in the open loop and closed loop modes.

<STEP 1>

OPEN LOOP MODE

1. 75% color bar alignment tape
2. SW2601 OPEN
3. AT menu Screen Options; CENTER/ENABLE
4. Variable X1 playback

<STEP 2>

1. SCOPE CH1 : TP2629
SCOPE CH2 : TP2630
(Strain Offset pots)
VR2609
VR2610
(Strain Offset pots)

<STEP 3>

1. Adjust VR2609 & 2610 ("STROSA" & "STROSB") for 0 volts at TP2629 & 2630.

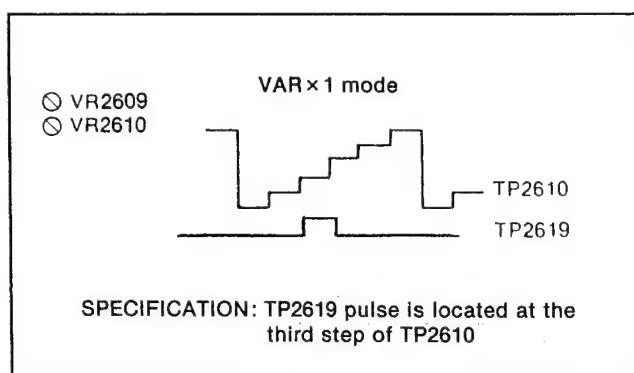
CLOSED LOOP MODE

<STEP 4>

1. Close the strain loop with SW2601.
2. Continue in Variable X1 playback.
3. While monitoring TP5006 & 5007, adjust the Strain Offsets VR2609 & 2610 for the voltages noted at in step (8-10).

<STEP 5>

1. Now, fine adjust VR2609 & 2610 for three conditions;
 - A). Proper rising staircase and pulse timing at TP2610 & 2619. (The stairs are rising from left to right, there are 6 or 8 steps (for NTSC or PAL), and the pulse is aligned with the highest step.
 - B). Maximum RF on the 4 "envelope" bar graphs on the Test/Servo/AT screen.
 - C). Zero volts plus or minus 50 volts at test points 5006 & 5007.



<STEP 6>

Repeat section 8-10, 8-11 until front panel envelope does not change when SW2601 is opened and closed.

8-12. GAIN ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2611[D1], TP2612[D1], TP2610[F1], TP2619 (TRIGGER[E1]) TP5006[C2],TP5007[C1] TP8 (S1) TP8 (S2) TP207 on REC Amp
MODE	VAR×1, FRAME STILL, SW2601 = CLOSE, H.A REGULATOR, P523 = ON, SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2611[G1], VR2612[H1]

<STEP 1>

1. AT Play "Frame" option on the SET UP/HOME screen or TEST/SERVO/AT screen.
2. CENTER/ENABLE on the Test/Servo/AT screen.
3. 75% color bar tape
4. Place the unit to STILL mode.
5. Set the AT head heights to zero from the front panel.

<STEP 2>

1. SCOPE CH1 : TP2610 Segment Pattern
SCOPE CH2 : TP2619 Pulse
VR2611 "STRGNA"
VR2612 "STRGNB"

<STEP 3>

1. Adjust VR2611 & 2612 for Maximum RF level on the "envelope" bar graphs on the front panel while maintaining the proper timing relationship between the pulse and Segment waveforms, at the fourth step.
2. As a rough check, the voltage in the play mode should be approximately 0 volts at TP5006 & 5007, and the segment LED should be off.

<STEP 4>

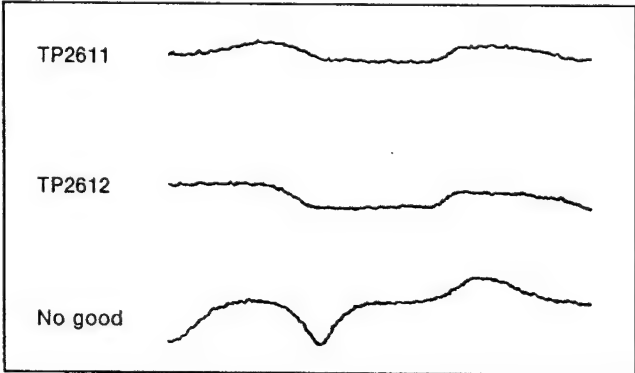
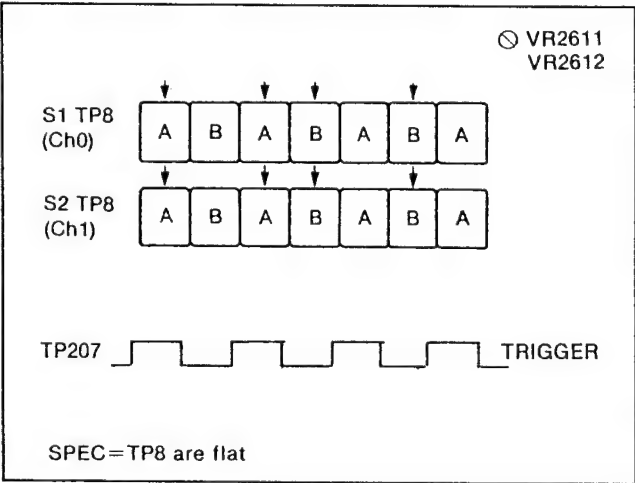
1. Next, fine adjust the circuit as follows;
2. AT Play "Frame" on the SETUP/HOME screen or TEST/SERVO/AT screen.
3. CENTER/ENABLE
4. SW2601 CLOSED
5. Variable STILL mode (not play Still).

<STEP 5>

1. SCOPE CH1 : TP8 on the S1 board
SCOPE CH2 : TP8 on the S2 board
TP207 for triggering
(on the REC Amp Board).
2. Fine adjust VR2611 & 2612 for flatness in the detected envelope, and maximum envelope level on the front panel meter.

Note:

1. If output waveform of TP8 is not clear, connect the scope to CH1 to TP2611 and CH2 to TP2612 on the AT board.
2. Confirm that output DC level is flat.



8-13. STRAIN LOOP FREQUENCY RESPONSE ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2629[G1] --- A CH WFM OUT TP2630[H1] --- B CH (ENVELOPE) TP2619[E1] --- (H SW) TRIGGER,
MODE	VAR X1, -X1, SW2601 = CLOSE, SEARCH-CENTER-PATTERN=ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	Composite color bar to VIDEO IN
ADJ.	VR2619(TWN A)[H2], VR2621(LGN A)[H2] - A CH VR2620(TWN B)[H2], VR2622(LGN B)[H2] - B CH

<STEP 1>

- SCOPE CH1 : WFM OUT (ENV)
CH2 : TP2619 (TRIG)
- Set the each VRS as follows.
VR2619, VR2620 : center position.
VR2621, VR2622 : fully counterclockwise

<STEP 2>

- Place the unit to VAR $\times 1$ mode.
- Set the AT height on the test menu to 1/3 level decrease (off track) from maximum envelope.
- Turn VR2619 and VR2620 to clockwise until output envelope waving is increase.
- Adjust VR2619 and VR2620 to counterclockwise so that the output envelope waving is minimum.
- Confirm that the SEGM lamp is OFF.
- After confirmation, set the AT HEIGHT to 0.
- Set the VR2621 and VR2622 to fully clockwise.

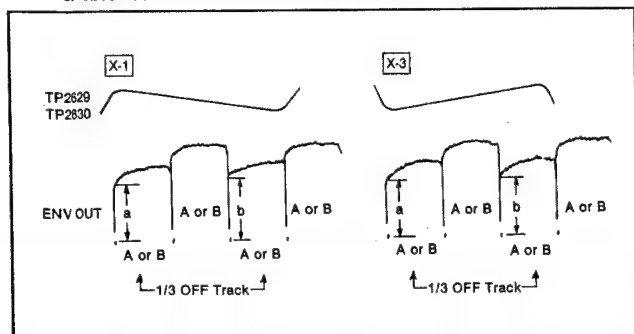
Note: Adjust each head (A,B) independently.

<STEP 3>

- Scope CH1 : WFM OUT (ENV pattern)
CH2 : TP2629, TP2630
CH3 : TP2619 (TRIG)
- Place the unit to VAR-X1 and VAR-X3.

<STEP 4>

- Set the AT height on the test menu to 1/3 level decrease (off track) from maximum envelope.
- Adjust VR2621 and VR2622 so that the droop of entrance side of output envelope is same level between a and b.



<STEP 5>

- Confirm that the SEGM lamp is OFF.
- After confirmation, set the AT HEIGHT to 0.

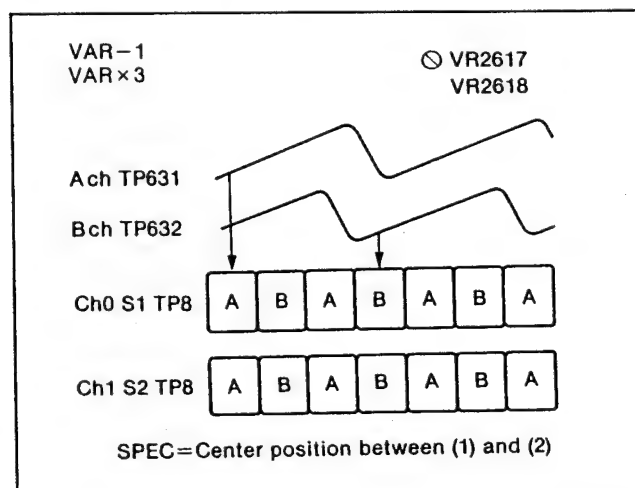
Note: Adjust each head (A,B) independently.

8-14. GROUP DELAY COMPENSATION ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP8[E2] → S1, TP8[E2] → S2, TP631[H2] → S4, TP632[H3] → S4
MODE	VAR $\times -1$, $\times 3 \rightarrow$ VAR $\times 1 \sim \times 3$
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2617[D1], VR2618[E1]

<STEP 1>

- AT Play Frame or Field.
- SCOPE CH1 : TP8 on the S1 board.
SCOPE CH2 : TP8 on the S2 board.
SCOPE CH3 : TP2631
SCOPE CH4 : TP2632
- Use the knob to activate the variable times 3 and variable times -1 modes, alternately.



- Confirm that the output waveform is flat as shown in figure.
- If it is not, adjust VR2617 and VR2618.

8-15. PRE READ CONFIRMATION (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2610[F1], TP2619[E1]
MODE	EDIT PLAY, SW2601-CLOSE, P523-ON AT TEST = NORMAL, PRE READ MODE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>

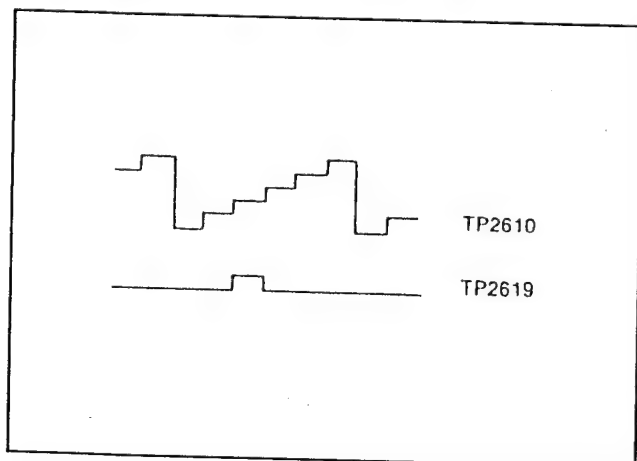
SCOPE CH1 : TP2610
SCOPE CH2 : TP2619

<STEP 2>

1. Set PRE READ mode as follows.
HOME MENU → F+F8(PRE READ ON) →
MANUAL EDIT MENU → F2 INSERT
2. PLAYBACK the Alignment Tape.

<STEP 3>

Confirm the pulse at TP2619 is located at 4TH (PAL), 3RD (NTSC) steps of TP2610 as shown below.



8-16. CONFIDENCE PB CONFIRMATION (S4 : AT)

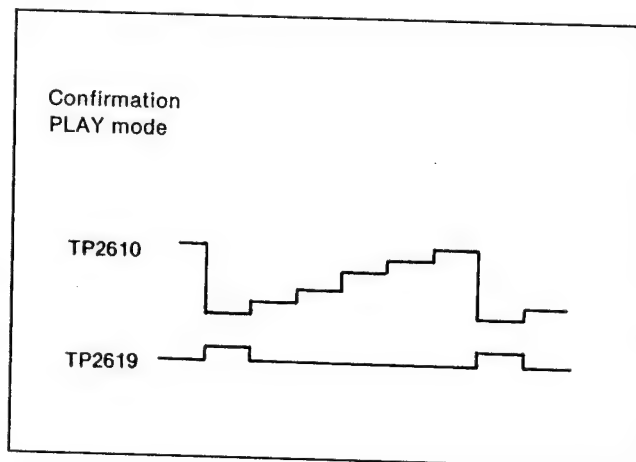
SPEC	REFER TO FIGURE
TEST	TP2610[F1], TP2619[E1]
MODE	CONFIDENCE PB HOME MODE, SW2601=CLOSE
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>

SCOPE CH1 : TP2610
SCOPE CH2 : TP2619

<STEP 2>

Confirm the pulse at TP2619 is located at Second steps of TP2610 as shown below.



FINAL CONFIRMATION OF AT ADJUSTMNET

SPEC	TP2619 PULSE IS LOCATED as shown in figure
TEST	TP2611[D1], TP2612[D1], TP2610[F1], TP2619(TRIGGER)[E1], TP5006, TP5007 (H.A REGULATOR)
MODE	VAR, FRAME STILL, SW2601 = CLOSE, P523 = ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR POSITION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2609 (STR OS A), VR2610 (STR OS B)[H1] VR2611[G1], VR2612[H1]

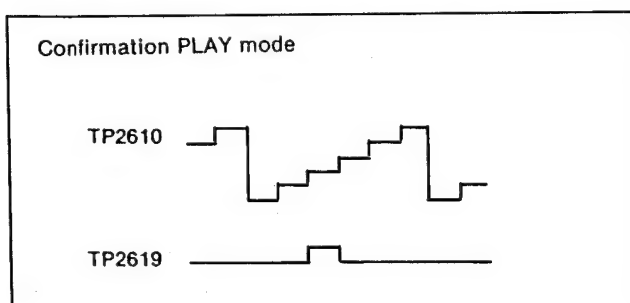
<STEP 1>

MACHINE CONDITION

1. VAR X1, P523 = ON, SW2601 = CLOSE
2. Set the AT mode, SEARCH = CENTER, PATTERN = ENABLE
3. Set the AT HEIGHT on the front panel, both A CH and B CH are 0.

<STEP 2>

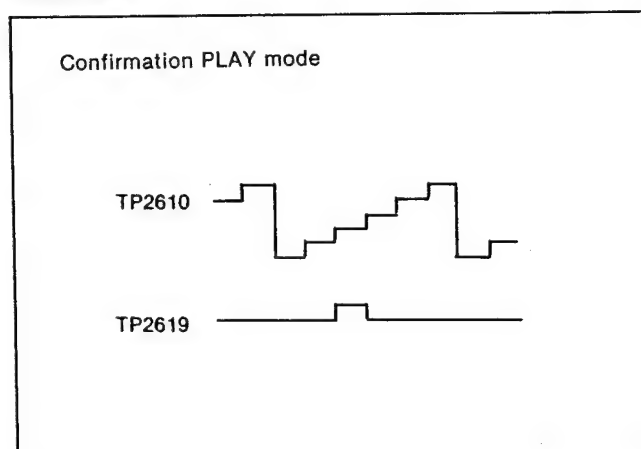
1. SCOPE CH1 : TP2610
CH2 : TP2619
CH3 : TP5006
(H.A REGULATOR Board)
CH4 : TP5007
(H.A REGULATOR Board)
2. Confirm the waveform is as shown in Figure.
If it is not, adjust VR2609 and VR2610.
3. Confirm that the DC voltage is $0 \pm 50V$ DC.
4. Confirm that the envelope output is maximum on the front display.
5. If it is not Readjust VR2609 and VR2610. (Refer to item 8-11 AT HEIGHT (2) ADJUSTMENT)



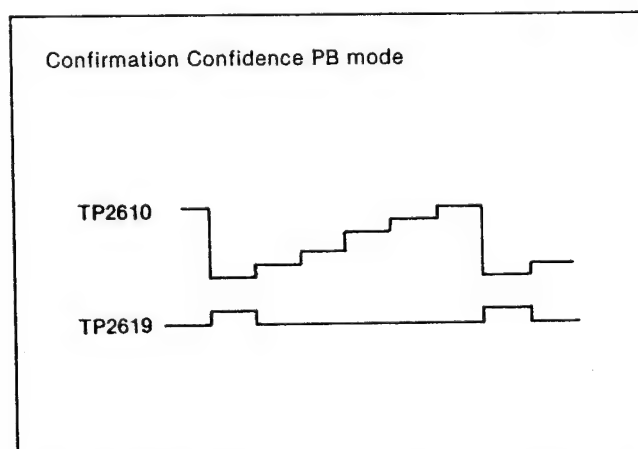
<STEP 3>

1. Set the AT mode to NORMAL (F1).
2. Place the unit in the PLAY mode.
3. Confirm the waveform is as shown in figure.

<STEP 4>



1. Place the unit in the Recording mode.
2. Confirm the waveform is as shown in figure.



3. If it is not, readjust VR2609 and VR2610. (Refer to item 8-11 AT HEIGHT (2) adjustment)

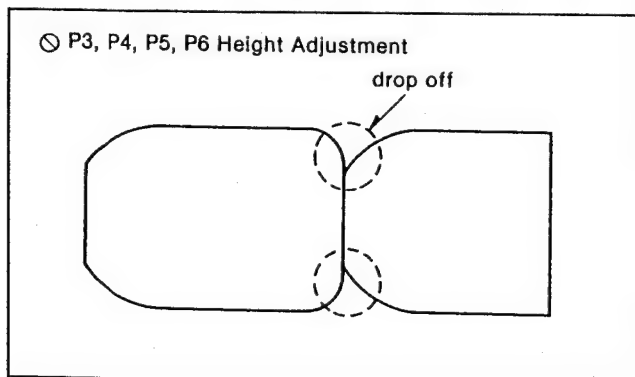
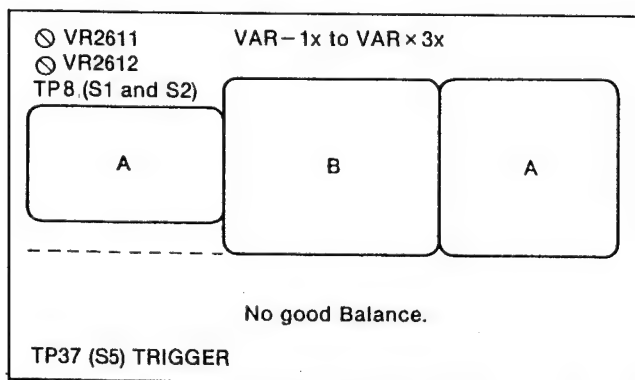
NOTE: If the segment steps is mached the pulse and segment, Segment LED is OFF.

<STEP 5>

1. SCOPE CH1 : TP8 (S1) on the Equalizer Board.
CH2 : TP8 (S2) on the Equalizer Board.
CH3 : TP37 (S5) on the SERVO Board. (for trigger)
2. Confirm that the envelope is flat from VAR X-1 to VAR X3. And check the CH A and CH B envelope output balance.

Note: If the envelope drop off at entrance side and exit side, in this case re-check the tape pass linearity. (Refer to P3 or P6 Height adjustment)

3. If it is not, readjust VR2611 and VR2612. (Refer to item 8-15 GAIN adjustment)



9. SERVO (S5) BOARD

9-1. CAPSTAN FG AMP ADJUSTMENT (S5 : SERVO)

SPEC	FG DC BIAS = $6.0V \pm 0.2V$ DC
TEST	P2210-14C[D5], P2210-16C[D5], TP14[F4], TP17[C4]
MODE	EE1 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE DC mode
INPUT	
ADJ.	VR1[I4], VR2[I4]

<STEP 1>

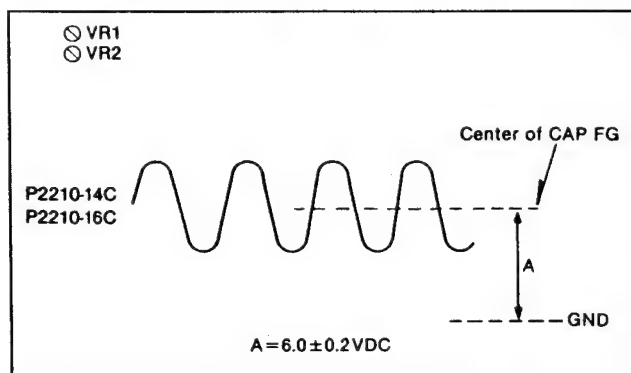
1. SCOPE : P2210-14C
2. Turn the capstan Motor by hand.
3. Adjust VR1 so that the center of CAP FG level A is $6.0V \pm 0.2V$ DC as shown in Figure.

<STEP 2>

1. SCOPE : P2210-16C
2. Turn the capstan Motor by hand.
3. Adjust VR2 so that the center of CAP FG level A is $6.0V \pm 0.2V$ DC as shown in Figure.

<STEP 3>

1. SCOPE CH1 : TP14
CH2 : TP17
2. Turn the capstan Motor by hand.
3. Confirm that the pulse is appeared on the scope.



9-2. TAKE UP REEL TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	T REEL TORQUE = $53gr.cm \pm 5gr.cm$
TEST	TAKE UP REEL
MODE	TAPE LOADING COMPLETION WITHOUT CASSETTE TEST MECH, NO FRLD
TAPE	SELF-RECORDING TAPE
M.EQ	DIAL TORQUE GAUGE(150g max.) --- VFK71 DIAL TORQUE GAUGE ADAPTOR--VFK0134 TENVELO METER --- VFK0132
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torque Gauge and set the Dial Torque Gauge on the Take Up Reel Motor.
4. Set the VTR into test mode.

TEST → SERVO → REEL → MEASURE → S.T

5. Place the unit in the STOP mode.
6. Place the unit into the Take Up Reel Torque Adjustment mode as shown below.

TEST → SERVO → REEL → F+F3

7. Adjust Front Panel adjustment VR so that the Take Up Reel Torque is within specification.

SPECIFICATION = $5.gr.cm \pm 5gr.cm$

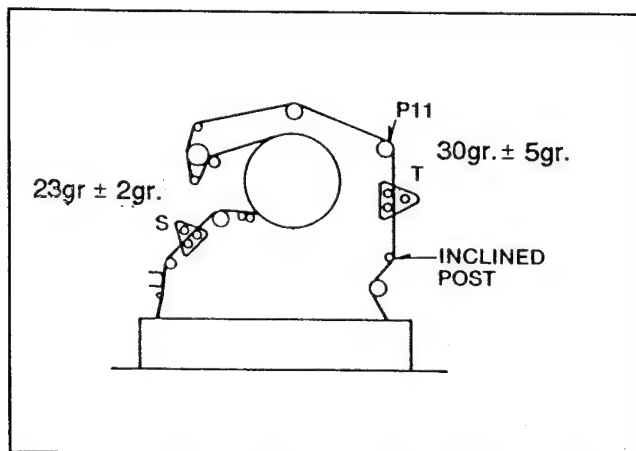
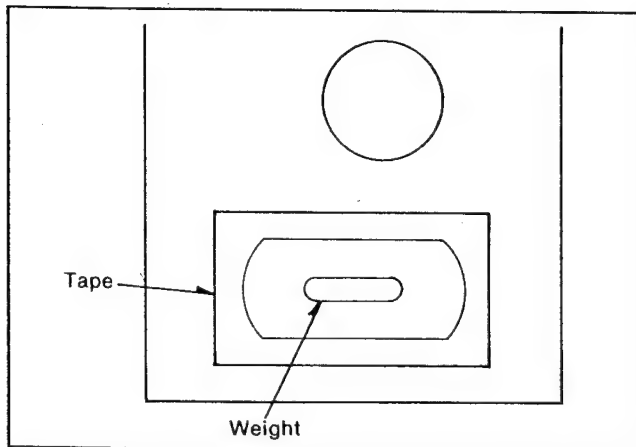
<STEP 2>

1. Insert a self recording tape.
2. Set the VTR into recording mode.
3. Adjust Take up Reel Torque so that the tension is within specification.

SPECIFICATION : $30gr.cm \pm 5gr.cm$

SPEC	1	2	3	4	5	6
Factory Set	ON	ON	OFF	OFF	OFF	ON
Service Mode	ON	ON	OFF	ON	OFF	ON

Service Switch



9-3. SUPPLY REEL TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	S REEL TORQUE = 45gr.cm ± 5gr.cm
TEST	SUPPLY REEL
MODE	TAPE LOADING COMPLETION WITHOUT CASSETTE TEST MECH, NO FRLD
TAPE	SELF-RECORDING TAPE
M.EQ	DIAL TORQUE GAUGE(150g max.) --- VFK71 DIAL TORQUE GAUGE ADAPTOR--VFK0134 TENVELO METER --- VFK0132
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torque Gauge and set the Dial Torque gauge, on the supply Reel Motor.
4. Set the VTR into Test mode.

TEST → SERVO → REEL → MEASURE → S.T

5. Place the unit in the STOP mode.
6. Place the unit into the Supply Reel Torque adjustment mode as shown below.

TEST → F8(SERVO) → F2(REEL) → F+F2(SREEL)

7. Adjust Front Panel adjustment VR so that the Supply Reel Torque is within specification.

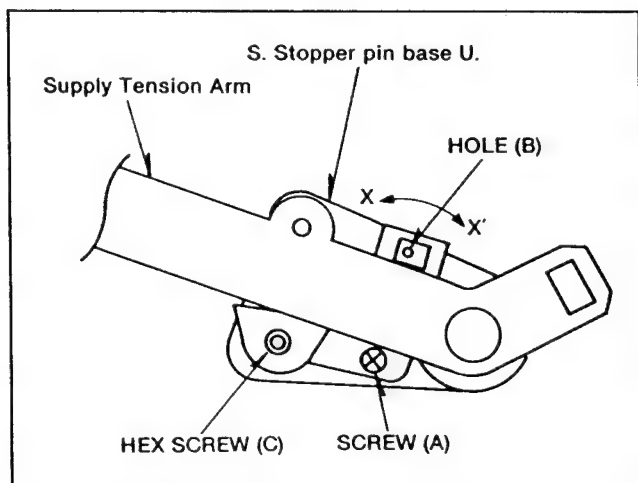
SPECIFICATION = 45gr.cm ± 5gr.cm

<STEP 2>

1. Insert a self recording tape.
2. Set the VTR into recording mode.
3. Adjust Supply Reel Torque so that the tension is within specification.

SPECIFICATION : 23gr.cm ± 2gr.cm (P2~P3)

4. If it is not within specification, loosen the screw (A).
5. Insert the Eccentric Screwdriver into Hole (B).
6. Adjust the position of S. Stopper Pin Base Unit so that the supply tension is 18gr.cm ~ 28gr.cm.
7. Insert the Hex Wrench to Hex Screw (C).
8. Adjust the position of S.Stopper Pin Base Unit so that the tension is 23 ± 2gr.
9. Tighten the screw (A), then reconfirm the tension after the screw (A) is tightened.



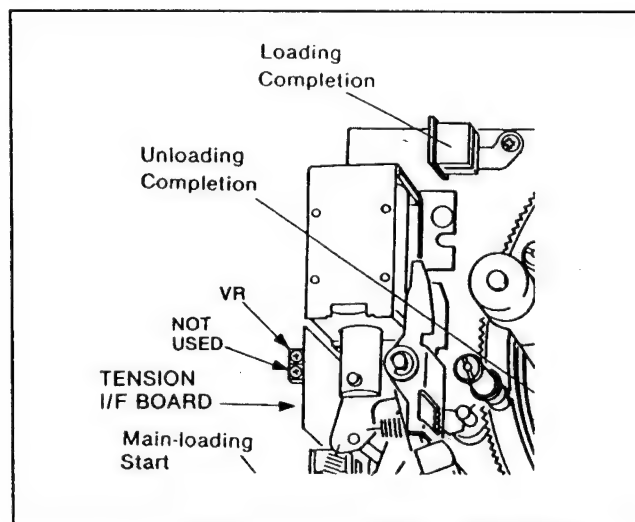
9-4. SENSOR AMP OFFSET ADJUSTMENT (S5 : SERVO)

SPEC	TP2201 = $2.5V \pm 0.001V$ DC
TEST	TP2201[G4]
MODE	EJECT
TAPE	
M.EQ	DIGIRAL VOLT METER
INPUT	
ADJ.	VR (on the Tension I/F P.C.Board)

<STEP 1>

1. DIGITAL VOLT METER : TP2201
2. Adjustment VR on the Tension I/F P.C.Board so that the DC voltage is $2.5V \pm 0.001V$ DC.

SPECIFICATION = $2.5V \pm 0.001V$ DC



9-5. SUPPLY SENSOR VOLTAGE ADJUSTMENT (S5 : SERVO)

SPEC	TP2201 = $2.5V \pm 0.02V$
TEST	TP2201[G4]
MODE	EJECT → STOP → PLAY
TAPE	
M.EQ	DIGITAL VOLT METER, MECHANICAL NEUTRAL, ECCENTRIC SCREWDRIVER
INPUT	
ADJ.	SUPPLY MAGNET SENSOR BASE UNIT POSITION

<STEP 1>

1. Turns power off.
2. Remove the cassette compartment.
3. Turns power on.
4. Set the VTR into Mech Test mode as shown below.

TEST → MECH → NO TAPE → M CASSETTE

5. Remove the P3 Stopper from the Mech Neutral Plate and set the Mech Neutral Plate on the Reel Table.
6. Press STOP key to set the loading completion mode.

<STEP 2>

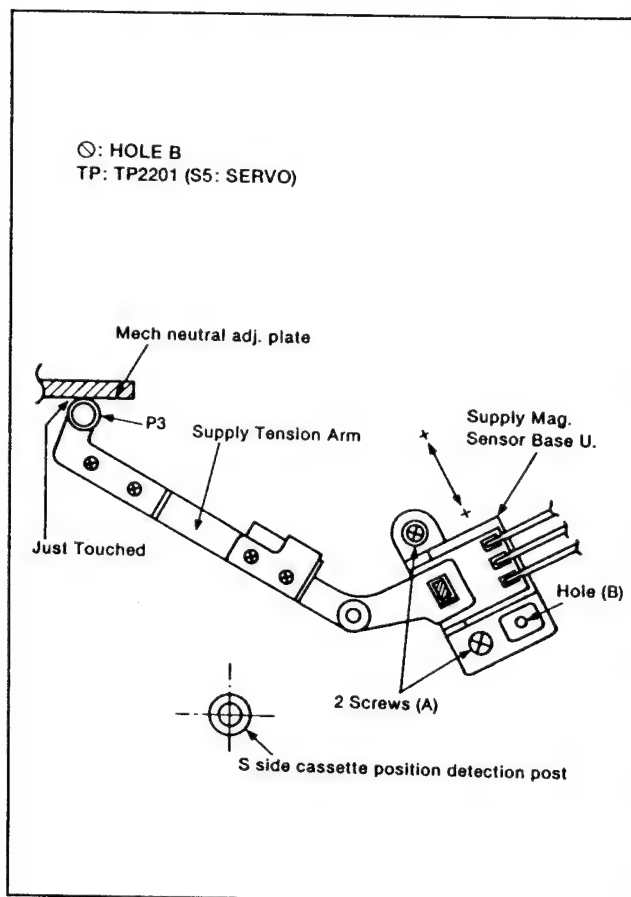
1. Make sure that the P3 post touches the arm of the Mechanical Neutral Plate as shown in Figure.
2. Confirm that the voltage at TP2201 is $2.5V \pm 0.001V$.
3. If it is not, loosen 2 screws (A) and insert the eccentric screw driver into hole (B).
4. Adjust the position of the Supply Magnet Sensor Base Unit until the voltage at TP2201 is in specification.

SPECIFICATION : $2.5V \pm 0.015V$

5. Tighten the 2 screws (A) and make sure the voltage at TP2201 does not change.
(Make sure the voltage at TP2201 does not change.)

<STEP 3>

1. Place the unit in the PLAYBACK mode.
2. Confirm that the voltage at TP2201 (V_s) $\pm 0.002V$.
3. If it is not, adjust the Supply Magnet sensor Base Unit, follow the procedure in <STEP 3>.



9-6. LOADING TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	LOADING TORQUE = 60gr.cm \pm 2gr.cm
TEST	TAKE UP REEL
MODE	
TAPE	
M.EQ	REEL TORQUE METER
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torque Gauge and set the Dial Torque Gauge on the Take Up Reel Motor.
4. Set the VTR into Mechanism Test mode.

TEST → SERVO → REEL → MEASURE → L

5. Place the unit in the STOP mode.
6. Place the unit into the Take Up Reel Torque Adjustment mode as shown below.

TEST → F8 (SERVO) → F2 (REEL) → F + F1 (LOADING)

7. Adjust Front Panel adjustment VR so that the Take Up Reel Torque is within specification.

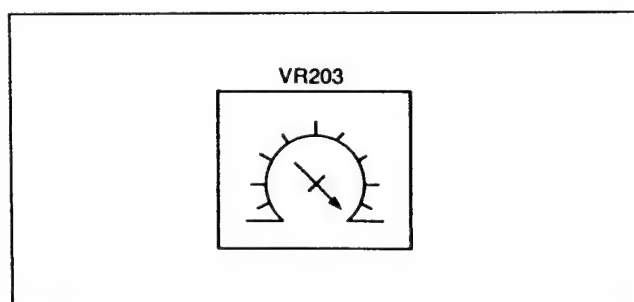
SPECIFICATION = 60gr.cm \pm 2gr.cm

9-7. CONFIRM THAT THE CAPSTAN ERROR MIX RATE VR (S5 : SERVO)

SPEC	
TEST	
MODE	
TAPE	
M.EQ	
INPUT	
ADJ.	VR203[G1], VR2011[]

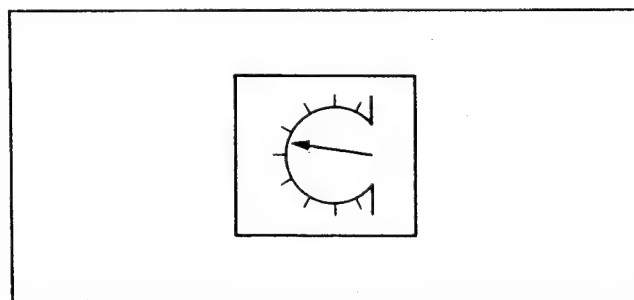
<STEP 1>

1. Turn VR203 to fully clockwise.



<STEP 2>

1. Set VR2011 to 5.5 division.



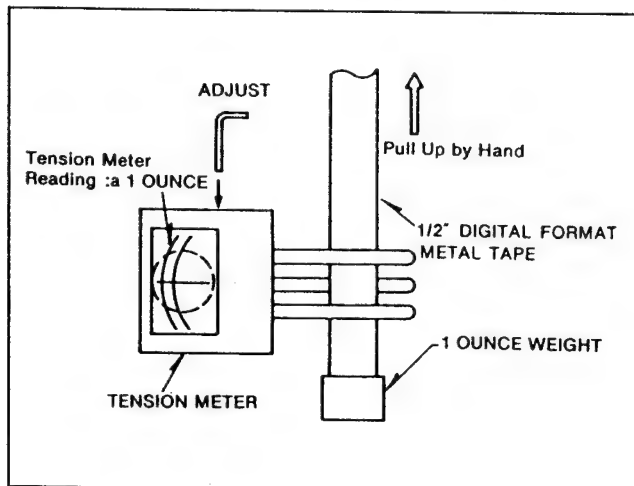
9-8. SUPPLY (FWD.) TENSION ADJUSTMENT (S5 : SERVO)

SPEC	TENSION = $23g \pm 2g$
TEST	"A" (P2 ~ P3), TP2201[G4]
MODE	PLAY → STOP
TAPE	BLANK 90min TAPE BEGINNING PORTION
M.EQ	TENSION METER, DIGITAL VOLT METER
INPUT	
ADJ.	SUPPLY STOPPER PIN BASE UNIT

<STEP 1>

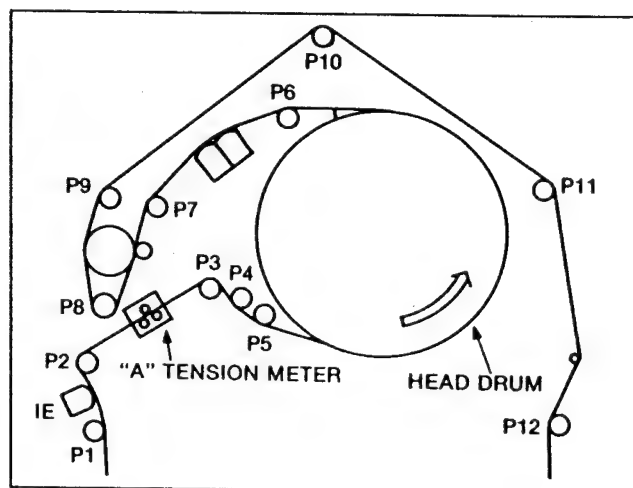
Calibration of Tension meter

1. Before performing of the tape tension adjustment. The Tension Meter should be checked as follows.
2. Use 1/2" Digital Metal tape and a 1 ounce weight.
3. Pull up a tape by hand as shown in Figure.
4. Adjust a Hex screw on the Tension Meter so that the tension meter reading is set for a 1 ounce.



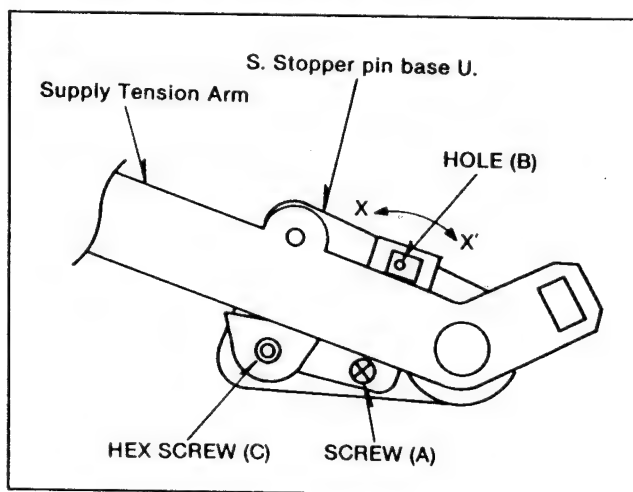
<STEP 2>

1. Insert the tension meter to between P2 and P3 post (portion "A") as shown in Figure.
2. Mode : PLAY, M cassette 90 min.
3. Confirm that the tape tension is $23 \pm 2g$ at the tape beginning portion.



<STEP 3>

1. If it is not within specification, loosen the screw (A).
2. Insert the eccentric screwdriver into Hole (B).
3. Adjust the position of S.Stopper Pin Base Unit so that the supply tension is 18gr ~ 28gr.
4. Insert the Hex Wrench to Hex screw (C).
5. Adjust the position of S.Stopper Pin Base Unit so that the tension is $23 \pm 2g$.
6. Finally, tighten the screw (A).
7. Reconfirm the tension after the screw (A) is tightened.



<STEP 4>

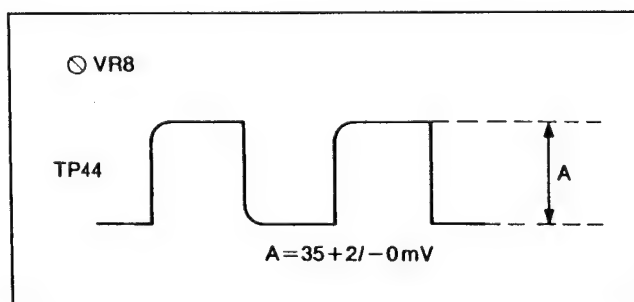
1. Place the unit in STOP mode. (Loading completed condition.)
2. SCOPE : TP2201
3. Confirm that the sensor voltage is $(2.5V) \pm 250mV$.

9-9. CTL REC CURRENT ADJUSTMENT (S5 : SERVO)

SPEC	TP44 = 35mV + 2mV/-0mV
TEST	TP44[H4], PROBE 1:1, GND = TPG5[G4]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8[G2]

<STEP 1>

- SCOPE : TP44
- Adjust VR8 so that the REC CTL pulse is 35 +2/-0 mV as shown in Figure.

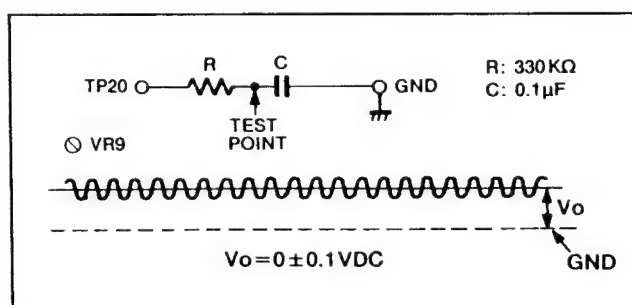


9-10. CONTROL PLAYBACK AMP OFFSET ADJUSTMENT (S5 : SERVO)

SPEC	TP20 + (CR) = 0V ± 0.1V DC
TEST	TP20[H1] ... REFER TO FIGURE
MODE	VAR 0.04
TAPE	NO SIGNAL RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR9[H2]

<STEP 1>

- SCOPE : TP20
- Adjust VR9 so that the DC level is 0 ± 0.1V DC.

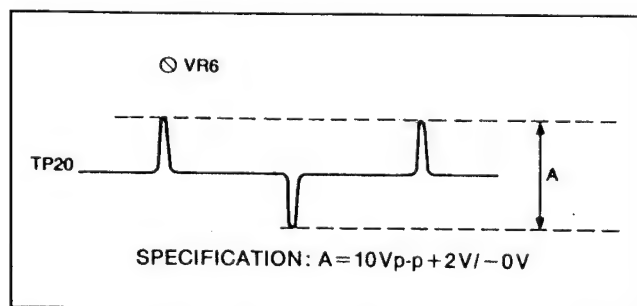


9-11. CTL PLAYBACK AMP GAIN ADJUSTMENT (S5 : SERVO)

SPEC	TP20 = 10Vpp +2V/-0V
TEST	TP20[H1]
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR6[H1]

<STEP 1>

1. SCOPE : TP20
2. Supply a color bar signal to Video Input and recorded.
3. Playback a just recorded portion.
4. Adjust VR6 so that the signal level A is 10 +2 Vp-p.
5. Confirm that the CF MODE and SERVO LED on the Front Panel turned on.

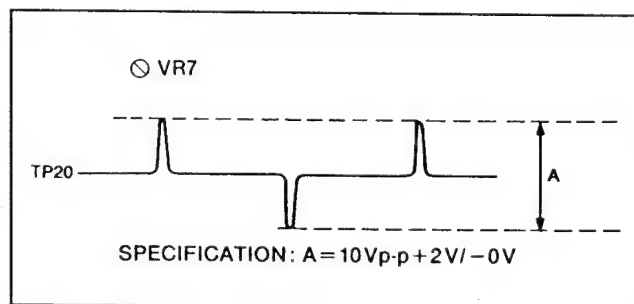


9-12. CTL PLAYBACK AMP F/V GAIN ADJUSTMENT (S5 : SERVO)

SPEC	TP20 = 10Vpp +2V/-0V
TEST	TP20[H1]
MODE	REC PLAY → VAR SPEED : × 0.52
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR7[F3]

<STEP 1>

1. SCOPE : TP20
2. Supply a color bar signal to Video Input and recorded.
3. Playback a just recorded portion by VAR × 0.52.
4. Adjust VR7 so that the signal level A is 10 +2 Vp-p.

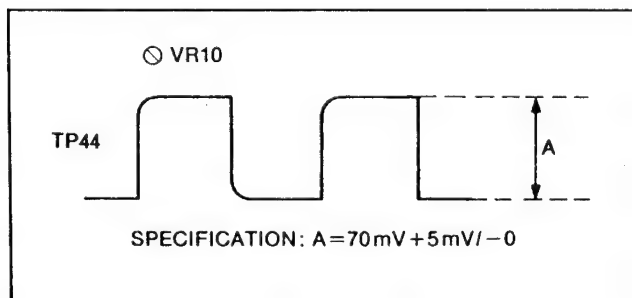


9-13. CTL REC CURRENT ADJUSTMENT (S5 : SERVO)

SPEC	TP44 = 70mV +5mV/-0mV
TEST	TP44[H4], PROBE 1:1, GND=TPG5[G3 or G4]
MODE	REC PLAY FAST FORMAT × 3 MODE
TAPE	SELF RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR to VIDEO IN
ADJ.	VR10[G1]

<STEP 1>

- SCOPE : TP44
- Place the unit in the Fast Format (X3) mode.
- Adjust VR10 so that the signal level A is 70mV + 5mV/0mV.



Cf:
Fast Format (X3) mode
HOME
SET UP
FORMAT
EXECUTE

9-14. PG SHIFTER ADJUSTMENT (S5:SERVO)

SPEC	T = 27.0 ± 0.5μsec
TEST	TP11 (REC AMP) TP37 (SERVO)
MODE	PLAY
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	SW2[F2], SW3

<STEP 1>

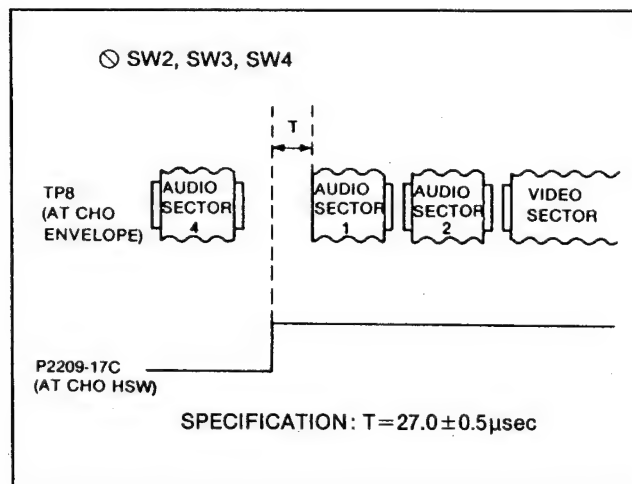
MENU CONDITION

TEST MENU

Select the TRACKING FIX/VAR F10 to "FIX".

<STEP 2>

- SCOPE CH1 : TP11 (REC AMP)
SCOPE CH2 : TP37 (SERVO)
- SCOPE TRIGGER : CH2
- Adjust SW2, 3 and 4 so that the period T is as shown in Figure.



SW2: Fine adjustment
SW3: Pre fine adjustment
SW4: Coarse adjustment

10. TIME CODE SECTION

10-1. SUPER C CURRENT ADJUSTMENT (S6 : TIME CODE)

TEST	VIDEO OUT 3, TV MONITOR
MODE	EE1, EJECT
TAPE	
M.EQ	TV MONITOR
INPUT	75% COLOR BAR
ADJ.	VR1[B1]

<STEP 1>

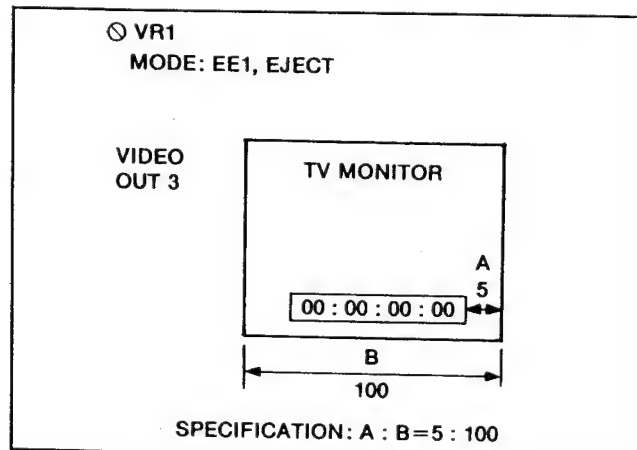
1. Set the VTR EE1 and EJECT mode.
2. Connect the TV monitor to VIDEO OUT 3.
3. Confirm the Time Code super is displayed on the monitor.

<STEP 2>

1. Set TC/CHR mode.
2. Set the POSITION (F1) from FIX to ARRANGE.
3. Press CURSOR RIGHT many times until the Time Code super reaches the right side of the TV monitor.

<STEP 3>

1. Adjust VR1 so that the Time Code super is displayed at right side of the monitor as shown in Figure.



10-2. PB LTC LEVEL ADJUSTMENT (S6 TIME CODE SUB)

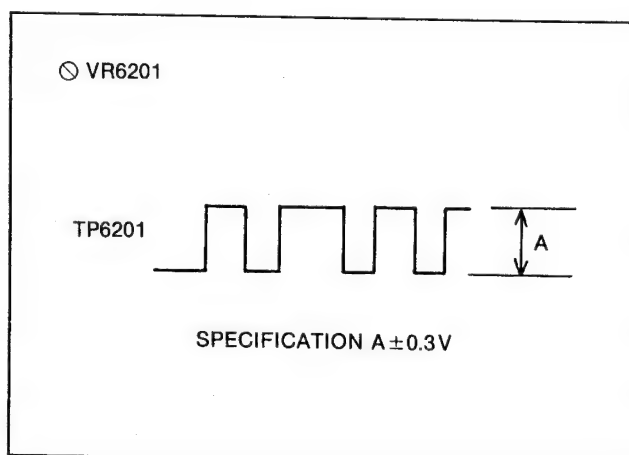
TEST	TP6201
MODE	PLAY
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	oscilloscope
INPUT	
ADJ.	VR6201

<STEP 1>

1. Place the VTR in the SHTL × 4 mode.
2. Verify that the LTC level A as shown in figure.

<STEP 2>

1. Place the VTR in the normal play mode.
2. Adjust VR6201 so that the LTC level is same as A level of SHTL × 4 mode.



12. AUDIO PROCESS (S8) BOARD

12-1. DIGITAL AUDIO INTERFACE (1) ADJUSTMENT (S8 : AUDIO PROCESS)

TEST	TP401[H3]
MODE	EE (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN CH1 (L) 1kHz -18dB, CH2 (R) 2kHz -18dB DIGITAL AUDIO to DIGITAL AUDIO IN
ADJ.	VR401[A2], VR403[A1]

4000 SERIES

<STEP 1>

1. SCOPE : TP401
2. Confirm that the level is High (+5V).
3. If it is not, adjust VR401 and VR403 so that the level is High (+5V).
4. Confirm that the level is always High (+5V), when turn the power ON.

<STEP 2>

1. Disconnect the Digital Audio Input Connector.
2. Confirm that the level is LOW (0V).

12-2. DIGITAL AUDIO INTERFACE (2) ADJUSTMENT (S8 : AUDIO PROCESS)

TEST	TP402[I3]
MODE	EE (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN CH3 (L) 1kHz -18dB, CH4 (R) 2kHz -18dB DIGITAL AUDIO to DIGITAL AUDIO IN
ADJ.	VR402[A3], VR404[A2]

<STEP 1>

1. SCOPE : TP402
2. Confirm that the level is High (+5V).
3. If it is not, adjust VR402 and VR403 so that the level is High (+5V).
4. Confirm that the level is always High (+5V), when turn the power ON.

<STEP 2>

1. Disconnect the Digital Audio Input Connector.
2. Confirm that the level is LOW (0V).

**12-3. CUE METER OFFSET
ADJUSTMENT
(S8 : AUDIO PROCESS)**

SPEC	LESS THAN -50dB
TEST	CUE METER
MODE	STOP
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR4551[B4]

<STEP 1>

1. Set the VTR EE1 and STOP mode.
2. Adjust VR4551 so that the cue meter is less than -50dB.

13. VIDEO A/D PLL (S9) BOARD

Adjust with this section, perform after completed adjustment with L1 and L4 section.

MENU CONDITION

AUDIO IN MENU

Select the VIDEO INPUT F3 to "ANALOG"

VIDEO OUT SET UP MENU

Select the VIDEO STANBY OFF to "EE2"

STANBY OFF

VIDEO : TAPE, EE1, *EE2

MENU CONDITION

TEST MENU

VIDEO FUNCTION

Pless the SCH F10 Key on the Front Panel and display the INPUT REF SCH METER.

13-1. INPUT PLL ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	REFER TO FIGURE
TEST	MONITOR TV
MODE	EE2 (EJECT)
TAPE	
M.EQ	MONITOR TV
INPUT	ANALOG COLOR BAR to VIDEO IN
ADJ.	VR401 (PLL ADJ.)[G4]

8000 SERIES

<STEP >

1. Connect the MONITOR TV to VIDEO OUT 1.
2. Confirm that the E-E picture is synchronized on Monitor TV.
3. If hte E-E picture is not synchronized on Monitor TV, adjust VR401 follow the below adjustment procedure.

<STEP 2>

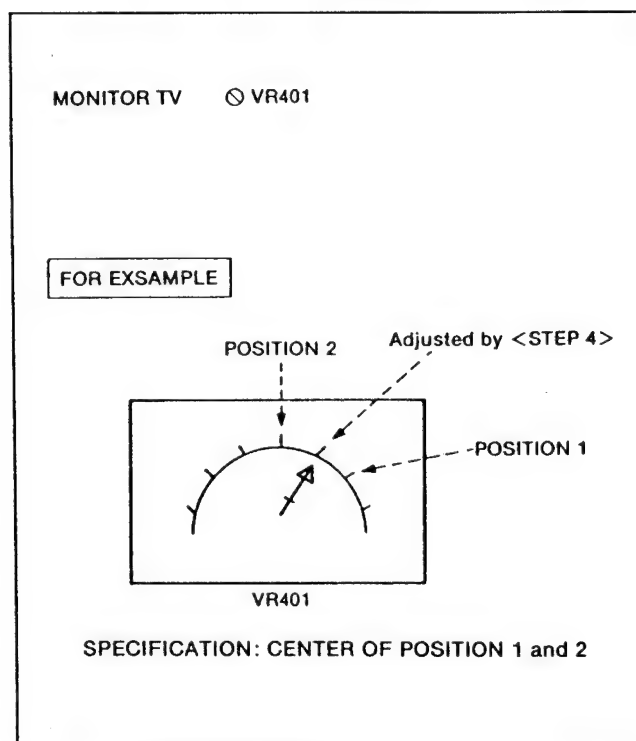
1. Turn VR401 fully clockwise and turn power OFF and ON.
2. Slowly turn VR401 to counter clockwise and adjust VR401 so that the E-E picture synchronized on Monitor TV.
3. Memorized position of VR401 as shown in Figure (Position 1).

<STEP 3>

1. Turn VR401 fully clockwise and turn power OFF and ON.
2. Slowly turn VR401 to counter clockwise and adjust VR401 so that the E-E picture synchronized on Monitor TV.
3. Memorized position of VR401 as shown in Figure (Position 2).

<STEP 4>

1. Set the VR401 in centered (position 1) and (position 2) sa shown in Figure.

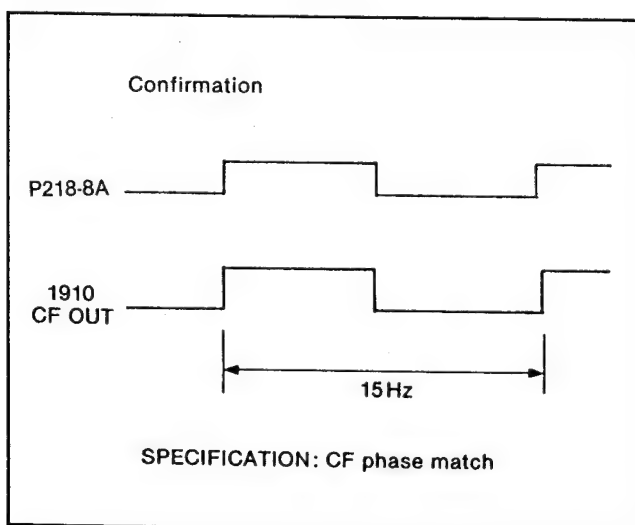


13-2. CF ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	AS SHOWN FIGURE
TEST	1910 CF OUT, P218 - 8A
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR TO VIDEO IN
ADJ.	VR602[H3]

<STEP 1>

1. SCOPE CH1 : 1910 CF OUT
CH2 : P218 - 8A
2. Confirm that the CF output of signal generator is same phase as P218 - 8A signal.
3. If not, readjust VR602.



13-3. SCH ADJUSTMENT (S9 : VIDEO A/D PLL)

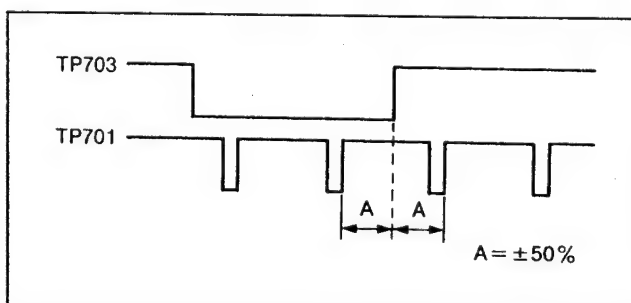
SPEC	AS SHOWN FIGURE
TEST	TP701[G2], TP703[G1]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR SIGNAL TO REF INPUT AND VIDEO IN
ADJ.	VR701[G1]

<STEP 1>

1. SCOPE CH1 : TP703 (TRIGGER)
CH2 : TP701
2. Set the SW701 to ON.

<STEP 2>

1. Turn VR701 to clockwise.
2. Adjust VR701 so that the waveform phase is as shown in figure.

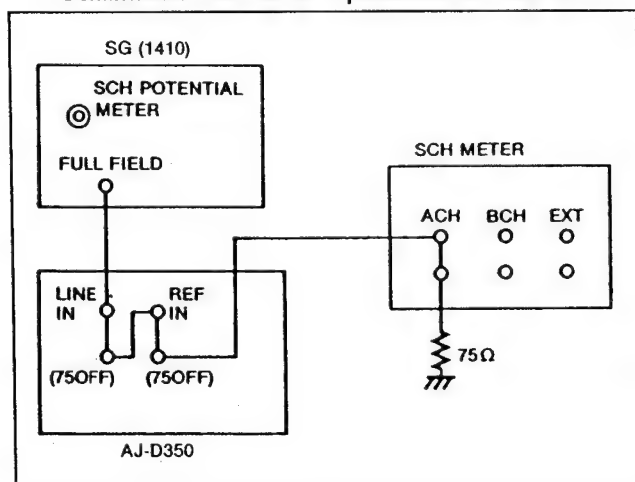


13-4. INCOME CF DETECTION ADJUSTMENT (1) (S9 : VIDEO A/D PLL)

SPEC	ALTERNATE +90° and -90°
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1410 75% COLOR BAR to VIDEO IN
ADJ.	VR702 (SCH DET 2) [G1], VR705 (SCH GAIN) [I2], VR706 (SCH OFFSET) [I2]

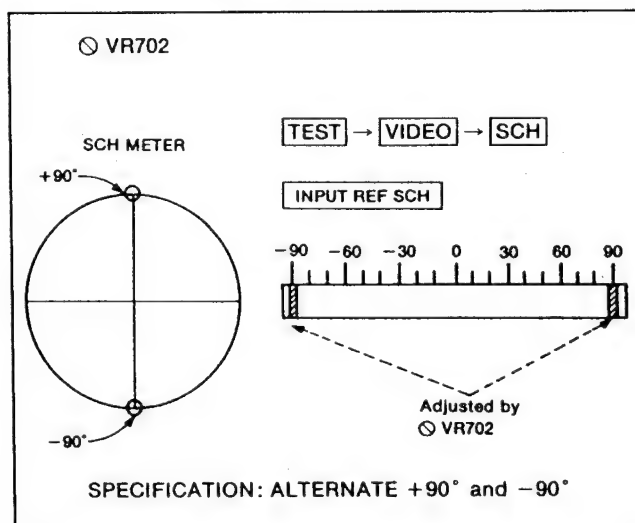
<STEP 1>

1. CONNECTION
2. CONFIRMATION
Confirmation that the SCH phase on SCH METER.



<STEP 2>

1. Set VR705 and VR706 to center position.
2. Adjust the Potential Meter on 1410 so that the SCH is -90° by turns.
3. Turn VR702 to fully clockwise.
4. Display the INPUT REF SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
5. Adjust VR702 so that the INPUT REF SCH METER displayed +90° and -90° by turns.
6. After finished this adjustment, perform 13-5 SCH METER ADJUSTMENT.



13-5. SCH METER ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1410 75% COLOR BAR to VIDEO IN
ADJ.	VR705 (SCH GAIN)[I2], VR706 (SCH OFFSET)[I2]

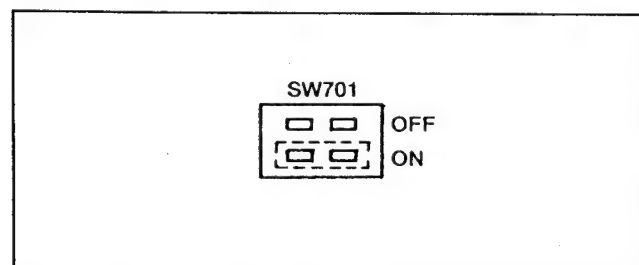
<STEP 1>

MACHINE CONDITION

Refer to <STEP 1> on item 13-2.

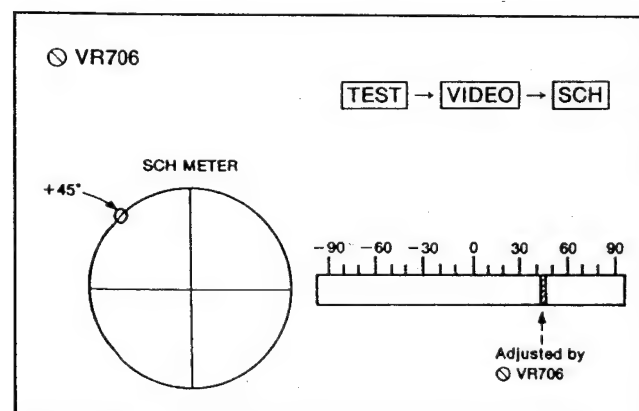
<STEP 2>

1. Confirm that the SCH of SW701 is set to ON position.



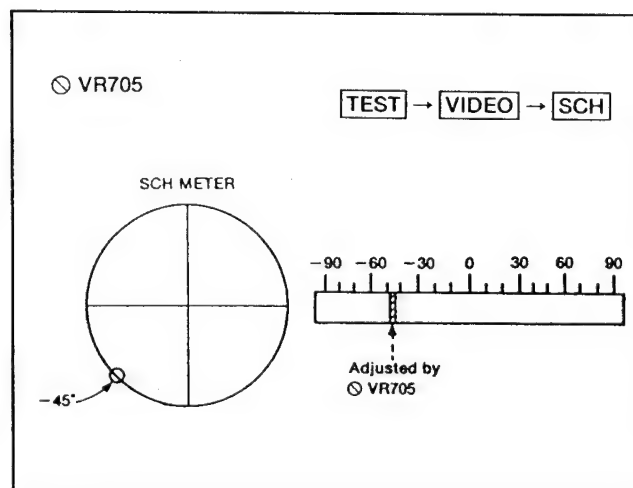
<STEP 3>

1. Set the SW701 to ON side as shown in Figure.
2. Adjust the Potention Meter VR on 1410 so that the SCH is +45° at SCH METER.
3. Display the INPUT SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
4. Adjust VR706 so that the INPUT SCH METER displayed +45°.



<STEP 4>

1. Adjust the Potention Meter VR on 1410 so that the SCH is +45° at SCH METER.
2. Display the INPUT SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
3. Adjust VR705 so that the INPUT SCH METER displayed -45°.



<STEP 5>

1. Re-adjust above <STEP 3> and <STEP 4> until stabilize the SCH indication.

13-6. INPUT SCH DETECTION ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	Voltage at TP707, TP708 = TP706 \pm 20mV
TEST	TP706[I1], TP707[I1], TP708[I2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER OSCILLOSCOPE
INPUT	1410 75% COLOR BAR to VIDEO IN
ADJ.	VR703 (SCH - H)[I2], VR704 (SCH - L)[I2]

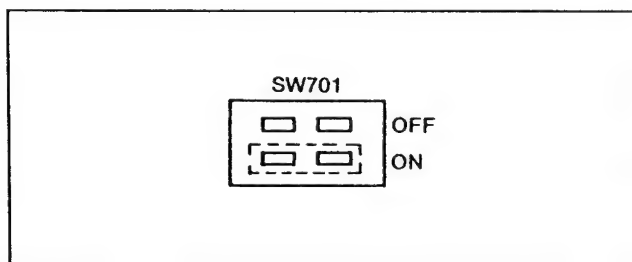
<STEP 1>

MACHINE CONDITION

Refer to <STEP 1> on item 13-2.

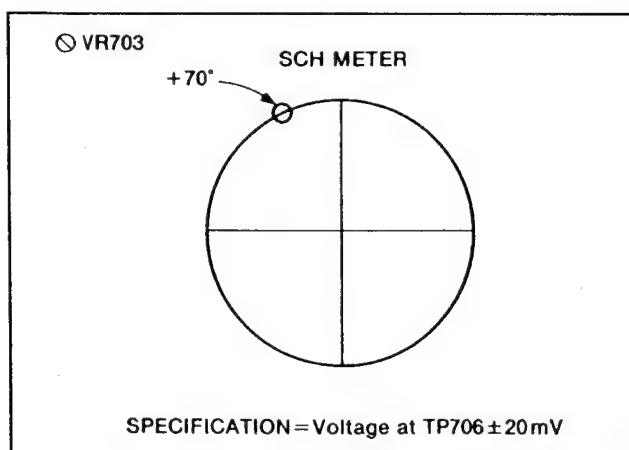
<STEP 2>

1. Confirm that the SCH of SW701 is set to ON position.



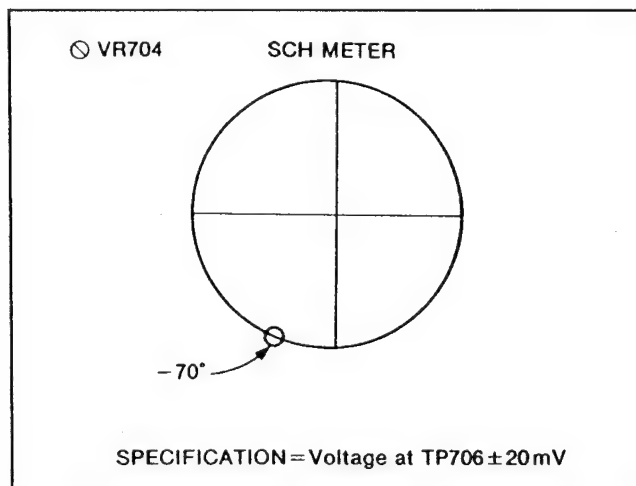
<STEP 3>

1. SCH METER : SCH mode
2. Adjust the Potention Meter VR on 1410 so that the SCH is +70° at SCH METER.
3. SCOPE CH1 : TP707
CH2 : TP706
4. Measure the voltage at TP706.
5. Adjust VR703 so that the DC voltage at TP707 is TP706 \pm 20mV.



<STEP 4>

1. Adjust the Potention Meter VR on 1410 so that the SCH is -70° at SCH METER.
2. SCOPE CH1 : TP708
CH2 : TP706
3. Adjust VR703 so that the DC voltage at TP708 is TP706 \pm 20mV.



13-7. INCOME CF DETECTION ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	FRONT SCH METER DISPLAY 0°
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR702 (SCH DET 2)[G1]

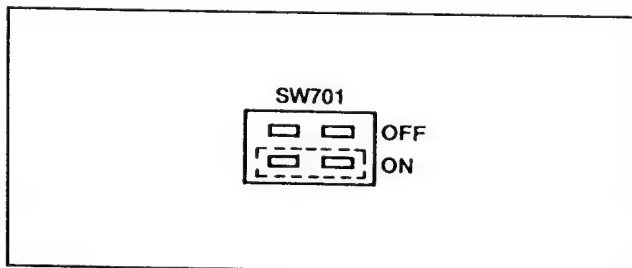
<STEP 1>

MACHINE CONDITION

Refer to <STEP 1> on item 13-2.

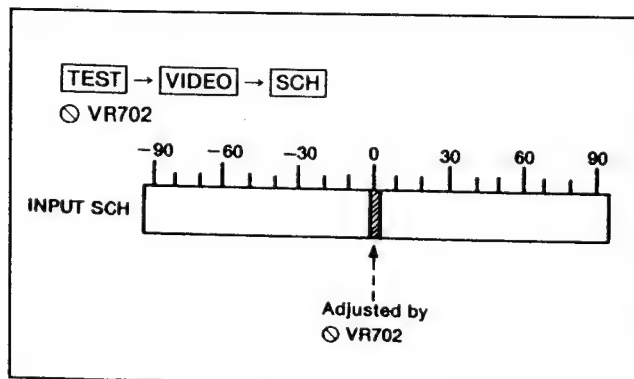
<STEP 2>

1. Confirm that the SCH of SW701 is set to ON position.



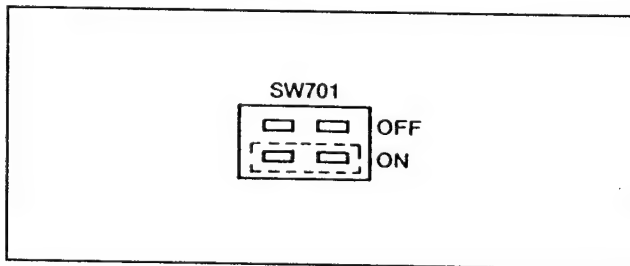
<STEP 3>

1. Turn the power OFF and ON.
2. Display the OUT REF SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
3. Adjust VR702 so that the OUT REF SCH METER displays 0°.



<STEP 4>

1. Confirm that the SW701 is set to ON position.

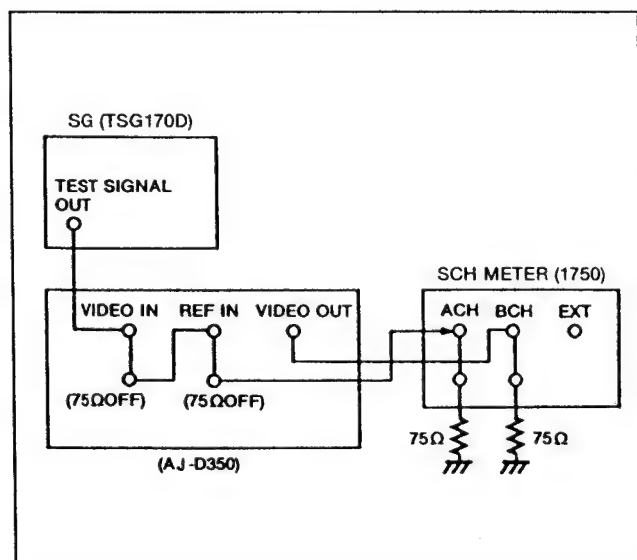


13-8. VIDEO PHASE ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	REFER TO FIGURE
TEST	VIDEO OUT IC611-Pin 2, TP401[G2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER OSCILLOSCOPE
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR601 (H PHASE)[G2]

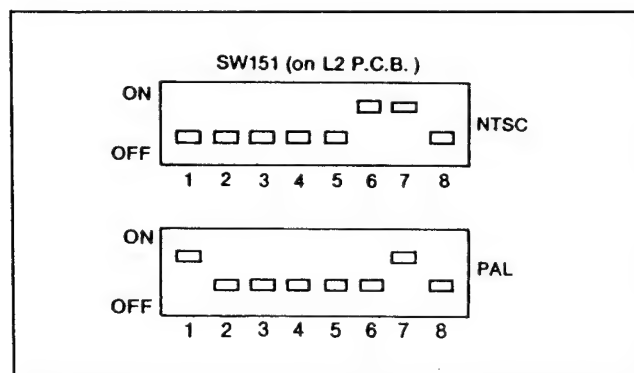
<STEP 1>

1. Connect the VTR as follows.



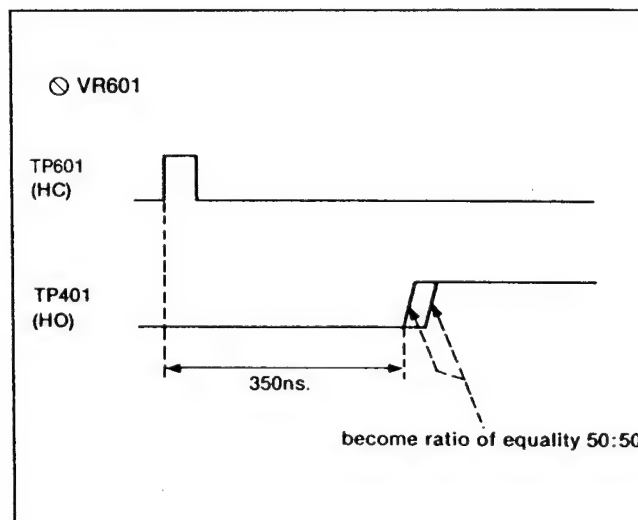
<STEP 2>

1. Set the Dip SW 151 on the L2 P.C.B. as follow as shown in Figure.



<STEP 3>

1. SCOPE CH1 : TP601
CH2 : TP401
2. Adjust VR601 so that the relation between HC and HO signal as shown in Figure.

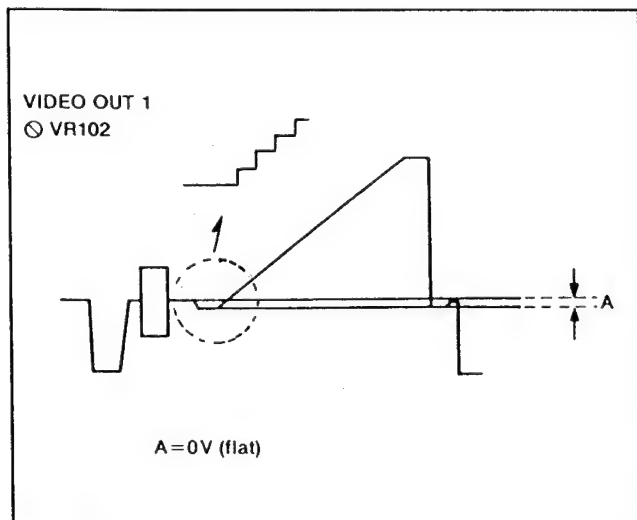


13-9. VIDEO INPUT CLAMP ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	A = 0V (FLAT)
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL RAMP SIGNAL to VIDEO IN
ADJ.	VR102 (CLAMP DC)[B3]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust VR102 so that the A portion is flat as shown in Figure.



<STEP 2>

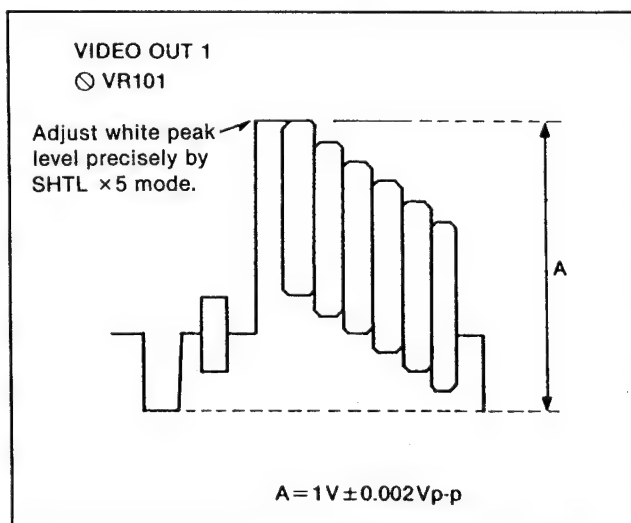
1. Expand WFM monitor by $\times 5$ mode.
2. Confirm that there are 3 stairs in the 5 divisions of WFM monitor as shown in figure.

13-10. VIDEO INPUT LEVEL ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	VIDEO OUT 1 = $1V \pm 0.002V_{pp}$
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR101 (A/D LEVEL [A3])

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust VR101 so that the Video Level (A) is $1 \pm 0.002V$ as shown in Figure.

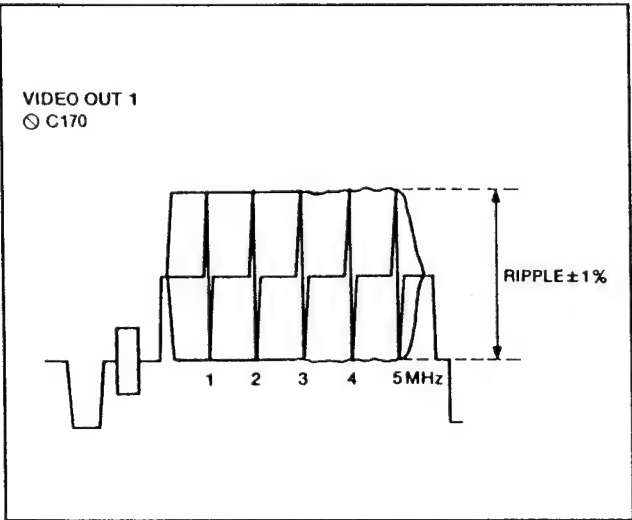


13-11. VIDEO INPUT FREQUENCY
ADJUSTMENT (1)
(S9 : VIDEO A/D PLL)

SPEC	RIPPLE ± 1%
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL H SWEEP to VIDEO IN
ADJ.	C170[A2]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust C170 so that level from 1MHz to 4MHz is flat as shown in Figure.

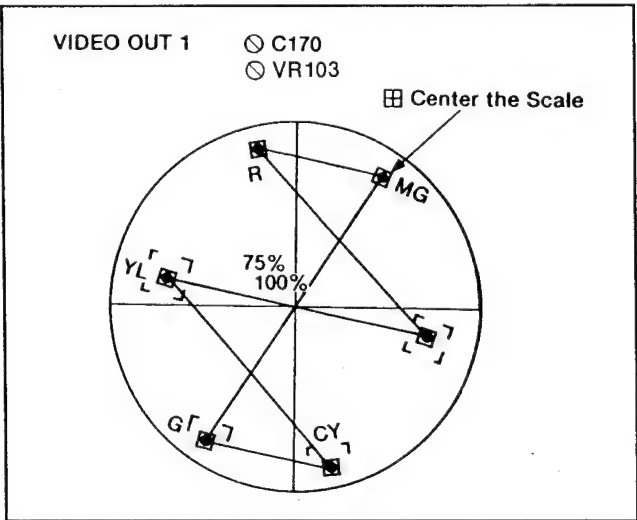


13-12. VIDEO INPUT FREQUENCY
ADJUSTMENT (2)
(S9 : VIDEO A/D PLL)

SPEC	CENTER OF THE SCALE
TEST	VIDEO OUT 1
MODE	E-E (EJECT)
TAPE	
M.EQ	VECTOR SCOPE
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	C170[A2], VR103[B3]

<STEP 1>

1. WFM MONITOR:VIDEO OUT 1
2. Adjust C170 so that each vector level is in center the scale of vector scope.
3. Adjust VR103 so that the each vector dot is in center of the box.



13-13. INPUT LEVEL METER ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	INPUT LEVEL METER = 0dB
TEST	INPUT LEVEL METER
MODE	E-E (EJECT)
TAPE	
M.EQ	
INPUT	(TSG273) 100% COLOR BAR to VIDEO IN
ADJ.	VR201 (BOT DC ADJ.)[D2], VR202 (AD VRT ADJ.)[D3]

<STEP 1>

MENU CONDITION

VIDEO IN MENU : F5

Select the LEVEL DET to "PEAK".

<STEP 2>

1. Adjust VR202 so that the VIDEO INPUT LEVEL METER is 0dB.

<STEP 3>

MENU CONDITION

VIDEO IN MENU : F5

Select the LEVEL DET to "SYNC".

<STEP 4>

1. Adjust VR201 so that the VIDEO INPUT LEVEL METER is 0dB.

14. REC AMP BOARD

Confirm that the Machine Condition with L2, L3, L4, S1 and S2 board, refer to Machine Condition at the beginning of SECTION 5 (REC/PLAY CH0/CH1)

14-1-(1). REC 2nd HARMONICS DISTORTION ADJUSTMENT (1) (REC AMP)

SPEC	MINIMUM 2ND HARMONICS
TEST	TP3 (CH0 A0)[B2], TP4 (CH0 B)[B2]
MODE	CW RECORDING
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	75% COLOR BAR
ADJ.	VR200[B6]

<STEP 1>

Set the spectrum analyzer as follows.

(REG 3)

REFERENCE LEVEL : 0dBm
 ATTEN : 10dB
 DIV (dB/DIV) : 10dB/div
 START FREQUENCY : 20MHz
 STOP FREQUENCY : 70MHz
 RES BW : 300kHz
 VIDEO BW : 10kHz
 SWEEP TIME : 30m sec
 TRIGGER : FREE RUN

<STEP 2>

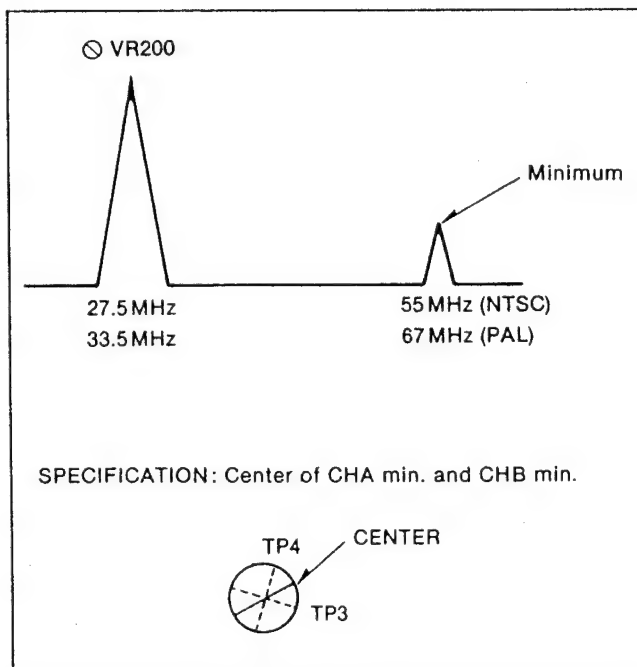
1. Insert a self recording tape to the VTR and set the VTR on Recording mode.
2. Set the Front Menu to CW Recording mode as follows.

TEST → RF → BS + F8 →
 (CURSOR CENTER) → ↓ ↓

3. Connect the spectrum analyzer probe to TP3.
4. SP USER MENU
Set the item "HEAD" to A from NOR
5. Adjust VR200 so that the 2ND Harmonics becomes minimum and memorize the VR200 position.
6. Connect the spectrum analyzer probe to TP4.
7. SP USER MENU

Set the item "HEAD" to B from A

8. Adjust VR200 so that the 2ND Harmonics becomes minimum and memorize the VR200 position.
9. Set the VR200 at center between item 5 and 8.
10. Press HOME key.



14-1-(2). REC 2nd HARMONICS DISTORTION ADJUSTMENT (2) (REC AMP)

SPEC	MINIMUM 2ND HARMONICS
TEST	TP7 (CH1 A)[B1], TP8 (CH1 B)[B1]
MODE	CW RECORDING
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	75% COLOR BAR
ADJ.	VR201[B6]

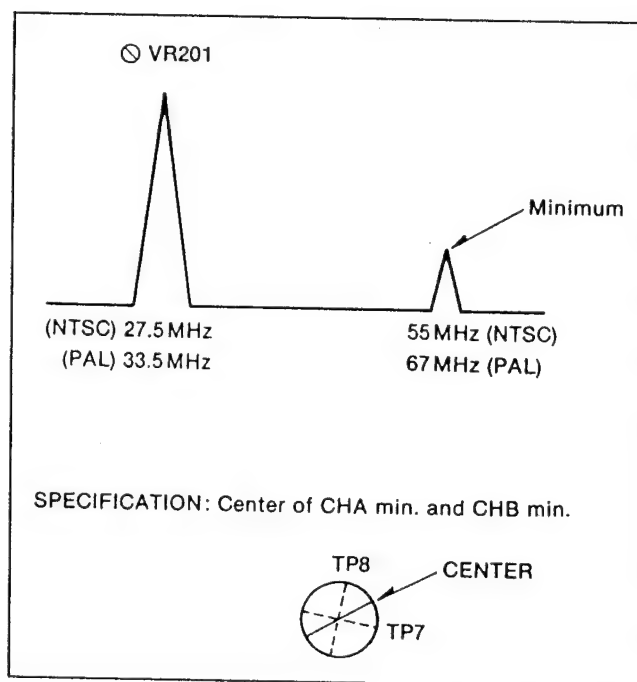
<STEP 1>

Set the spectrum analyzer as follows.
(REG 3)

REFERENCE LEVEL : 0dBm
ATTEN : 10dB
DIV (dB/DIV) : 10dB/div
START FREQUENCY : 20MHz
STOP FREQUENCY : 70MHz
RES BW : 300kHz
VIDEO BW : 10kHz
SWEEP TIME : 30m sec
TRIGGER : FREE RUM

<STEP 2>

1. Insert a self recording tape to the VTR and set the VTR on Recording mode.
2. Set the Front Menu to CW Recording mode as follows.
TEST → RF → BS + F8 →
(CURSOR CENTER) → ↓ ↓
→ →
3. Connect the spectrum analyzer probe to TP7.
4. SP USER MENU
Set the item "HEAD" to A from NOR
5. Adjust VR201 so that the 2ND Harmonics becomes minimum and memorize the VR201 position.
6. Connect the spectrum analyzer probe to TP8.
7. SP USER MENU
Set the item "HEAD" to B from A
8. Adjust VR201 so that the 2ND Harmonics becomes minimum and memorize the VR201 position.
9. Set the VR201 at center between item 5 and 8.
10. Press HOME key.



14-2. REC CURRENT and REC EQUALIZER ADJUSTMENT (CH0) (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8 (S1 BOARD), TP207 (REC AMP BOARD) → EXT IN
MODE	REC mode
TAPE	75% COLOR BAR ALIGNMENT TAPE SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (S MENU) VR2 (CH0 A FREQ), VR4 (CH0 B FREQ)

<STEP 1>

Set the spectrum analyzer as follows.
(REG 4)

REFERENCE LEVEL : -10.0dBm
ATTEN : 10dB
DIV (dB/DIV) : 5dB/div
START FREQUENCY : 0Hz
STOP FREQUENCY : 50MHz
RES BW : 1MHz
VIDEO BW : 3kHz
SWEEP TIME : 300m sec
TRIGGER : EXT(HEAD SW)

<STEP 2>

Set the VTR shuffling off, error correction off and error concealment off mode.

L2 SW51-2 (OFF), SW51-3 (OFF)
L3 SW1 (OFF), SW2 (OFF), SW3 (OFF),
SW4 (OFF)
L4 SW802 (OFF)

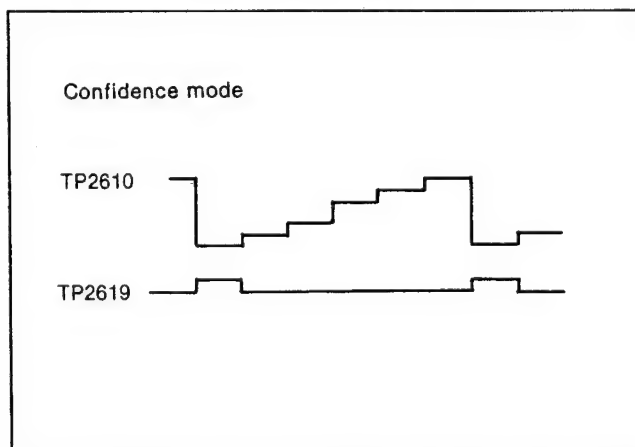
<STEP 3>

1. Connect the spectrum analyzer probe to TP8 on S1 Board.
2. Playback a Shuffling off 75% color bar alignment tape.

<STEP 4>

1. SCOPE CH1 : TP2610 (S4)
SCOPE CH2 : TP2619 (S4)
2. Set the machine condition as follows.
VIDEO OUT → SET UP → STATE → [] (CURSOR
CENTER)
[→] → [→] → [→] (EDIT REC) → TAPE → MANUAL
EDIT → INSERT

3. Set the VTR PLAY mode.
4. Confirm that the waveform is shown below and the envelope level on the front panel bar graph becomes maximum.
If not, adjust Front Panel adjustment knob so that the these two conditions will be satisfied.
TEST → SERVO → AT → F4(CENTER) → EXIT → EXIT
→ RF → AT HEIGHT (F7) → BS+F8 → [] (CURSOR
CENTER) → F+[←]
A and B Heads are selected by cursor key [←] [→].



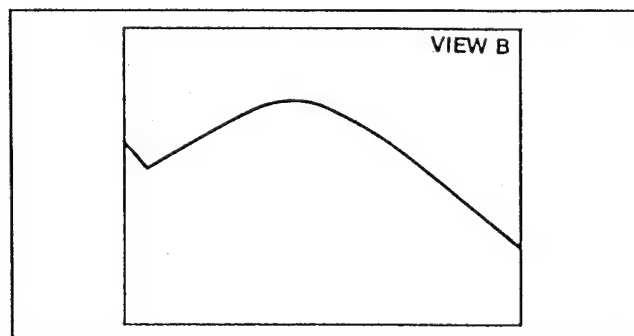
Note: This AT HEIGHT adjustment is tentative adjustment to get maximum envelope in correct AT Trace. Actual AT Adjustment must be done in AT (S4) Adjustment.

<STEP 5>

1. Memorize the frequency characteristics waveform to VIEW B of the spectrum analyzer.
2. Set the machine condition as follows.

MANUAL EDIT → INSERT (INSERT OFF mode).

Note: STEP 4 and 5 place the AT Heads in the confidence position, when in Playback mode.
The frequency characteristics can then be memorized and compared to the Rec frequency characteristics.



<STEP 6>

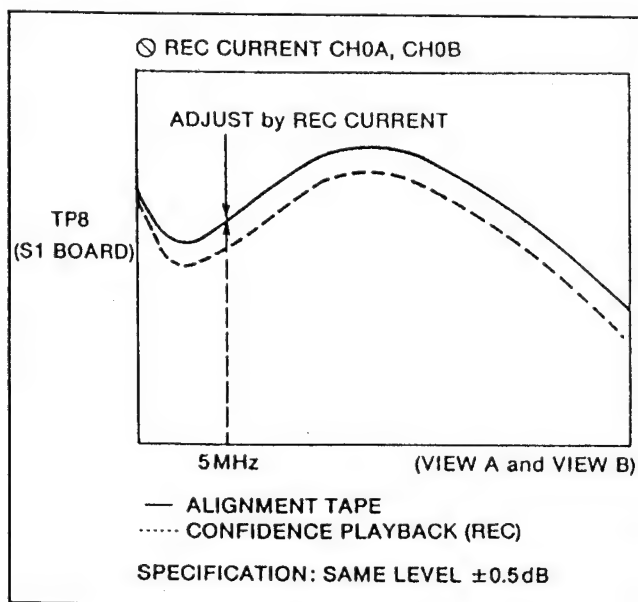
1. Eject the alignment tape and insert a self recording tape.
2. Connect the spectrum analyzer probe to TP8 on S1 Board.
3. Set the VTR in Rec mode.
4. Make sure that the AT Head height is correct position to get maximum envelope on CH0 display.
5. Set the FRONT MENU to REC CURRENT mode.

TEST → RF → F4(REC CURRENT) → BS+F8 → []
(CURSOR CENTER) → F+ [←]
CH0 A, CH0 B, CH1 A, CH1 B Heads are selected by
cursor key [↑] [↓].

6. Confirm that envelope on the bar graph is still keeping maximum level. If not, back to AT-HEIGHT adjusting menu and readjust Front Panel adjusting knob to get maximum level of envelope.
7. Set spectum analyzer to REG 5. (refer to set up chart).

<STEP 7>

Adjust the REC Current CH0 A and CH0 B so that the waveform level is same level with the alignment tape play level at 5MHz.

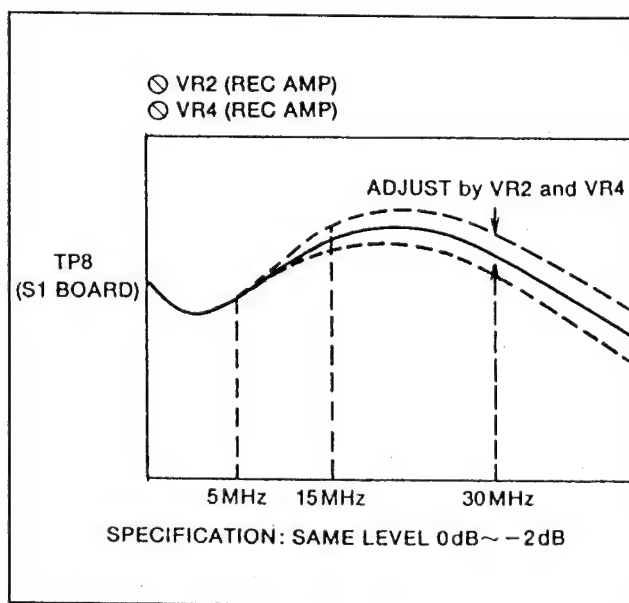


<STEP 8>

1. CH0B Rec Current Adjustment is same as CH0A which is described STEP 6- ~ STEP 7. (Just change the CH).

<STEP 9>

1. Adjust VR2 (CH0 A) and VR4 (CH0 B) so that the waveform level is same at 30MHZ as shown below and confirm that the error rate on the front panel is minimum.
2. If it is not, set the CH0 B to -128 by using adjustment VR on the front panel. And adjust VR2 (CH0 A) so that the error rate is minimum and same level.
3. Adjust VR4 (CH0 B) so that the error rate is minimum by using the same method above.

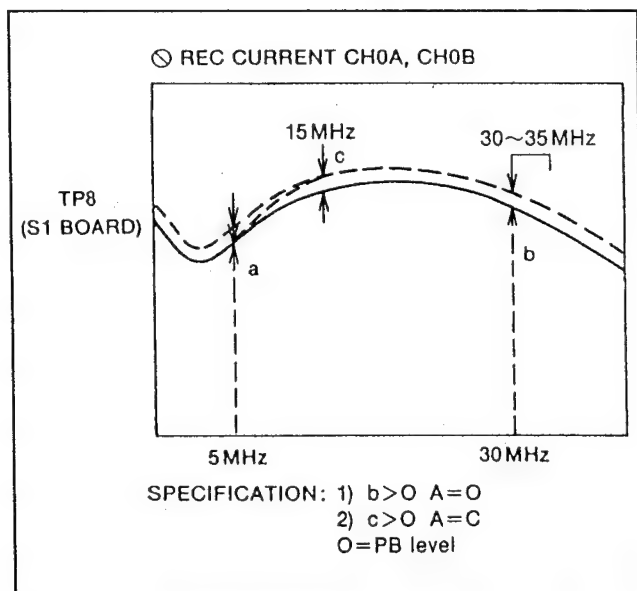


<STEP 10>

1. If level is increased at 30MHz to 35MHz, adjust REC CURRENT CH0 A and CH0 B so that the output level at 5MHz is same level. (A:0).
2. If the level is increased at 5MHz, adjust REC CURRENT CH0 A and CH0 B so that the output level at 5MHz is same increasing value. (a:c).

Caution : Adjustment point of VR2 and VR4 are as shown below.



**<STEP 11>**

1. Set the machine condition as follows.

VIDEO OUT → SET UP → STATE → [] (CURSOR CENTER)
 [→] → [→] → [→] (EDIT REC) → TAPE →
 MANUAL EDIT → INSERT

2. Set the VTR PLAY mode.
3. Confirm that the waveform level is same and error rate is minimum.

<STEP 12>

Set the AT HEIGHT Front Menu to all 0.

14-3. REC CURRENT and REC EQUALIZER ADJUSTMENT (CH1) (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8(S2 BOARD), TP207(S2 BOARD) → EXT IN
MODE	VAR × 1
TAPE	75% COLOR BAR ALIGNMENT TAPE SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (SP MENU) VR7 (CH1 A FREQ), VR9 (CH1 B FREQ)

<STEP 1>

Set the spectrum analyzer as follows.

(REG 4)

REFERENCE LEVEL : -10dBm
 ATTEN : 10dB
 DIV (dB/DIV) : 5dB/div
 START FREQUENCY : 0Hz
 STOP FREQUENCY : 50MHz
 RES BW : 1MHz
 VIDEO BW : 3kHz
 SWEEP TIME : 300m sec
 TRIGGER : EXT (HEAD SW)

<STEP 2>

Set the VTR shuffling off, error correction off and error concealment off mode.

L2 SW51-2 (OFF), SW51-3 (OFF)
 L3 SW1 (OFF), SW2 (OFF), SW3 (OFF),
 SW4 (OFF)
 L4 SW802 (OFF)

<STEP 3>

1. Connect the spectrum analyzer probe to TP8 on S2 Board.
2. Playback a Shuffling off 75% color bar alignment tape.

<STEP 4>

1. SCOPE CH1 : TP2610 (S4)
SCOPE CH2 : TP2619 (S4)
2. Set the machine condition as follows.

VIDEO OUT → SET UP → STATE → [] (CURSOR CENTER)

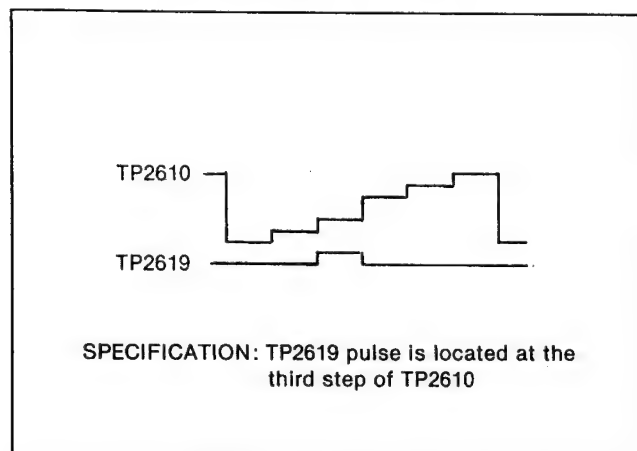
[→] → [→] → [→] (EDIT REC) →

TAPE → MANUAL EDIT → INSERT

3. Set the VTR PLAY mode.
4. Confirm that the waveform is shown below and the envelope level on the front panel bar graph becomes maximum.
If not, adjust Front Panel adjustment knob so that the these two conditions will be satisfied.

TEST → SERVO → AT → F4(CENTER) → EXIT → EXIT → RF → AT HEIGHT → BS+F8 → [] (CURSOR CENTER) → F+[←]

A and B Heads are selected by cursor key [←] [→].

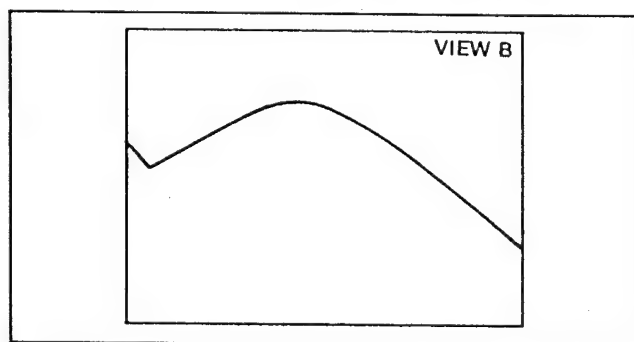


Note: This AT HEIGHT adjustment is tentative adjustment to get maximum envelope in correct AT Trace. Actual AT Adjustment must be done in AT (S4) Adjustment.

<STEP 5>

1. Memorize the frequency characteristics waveform to VIEW B of the spectrum analyzer.
2. Set the machine condition as follows.
MANUAL EDIT → INSERT (INSERT OFF mode).

Note: STEP 4 and 5 is place the AT Heads in the confidence position, when in Playback mode.
The frequency characteristics can be memorized and compared to the Rec frequency characteristics.



<STEP 6>

1. Eject the alignment tape and insert a self recording tape.
2. Connect the spectrum analyzer probe to TP8 on S2 Board.
3. Set the VTR in Rec mode.
4. Make sure that the AT Head height is correct position. to get maximum envelope on CH1 display.
5. Set the FRONT MENU to REC CURRENT mode.

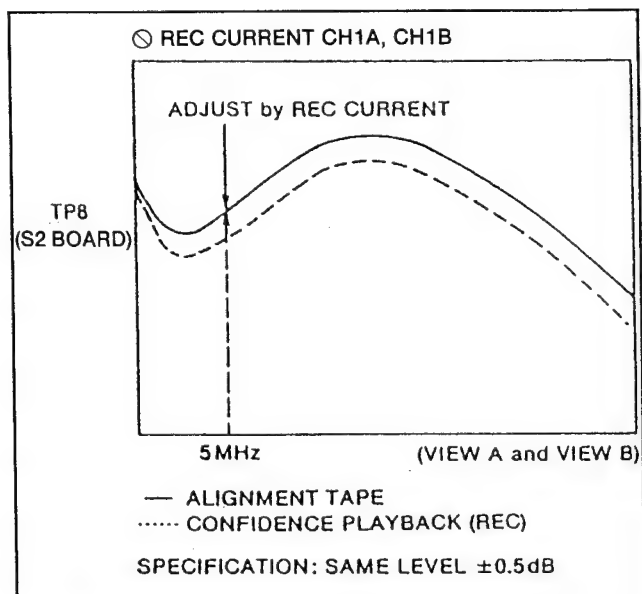
TEST → RF → F4(REC CURRENT) → BS+F8 → [] (CURSOR CENTER) → F+[←]

CH0 A, CH0 B, CH1 A, CH1 B Heads are selected by cursor key [↑] [↓].

6. Confirm that envelope on the bar graph is still keeping maximum level. If not back to AT-HEIGHT adjusting menu and readjust Front Panel adjusting knob to get maximum level of envelope.
7. Set spectrum analyzer to REG 5. (refer to set up chart).

<STEP 7>

Adjust the REC Current CH1 A and CH1 B so that the waveform level is same level with the alignment tape play level at 5MHz.

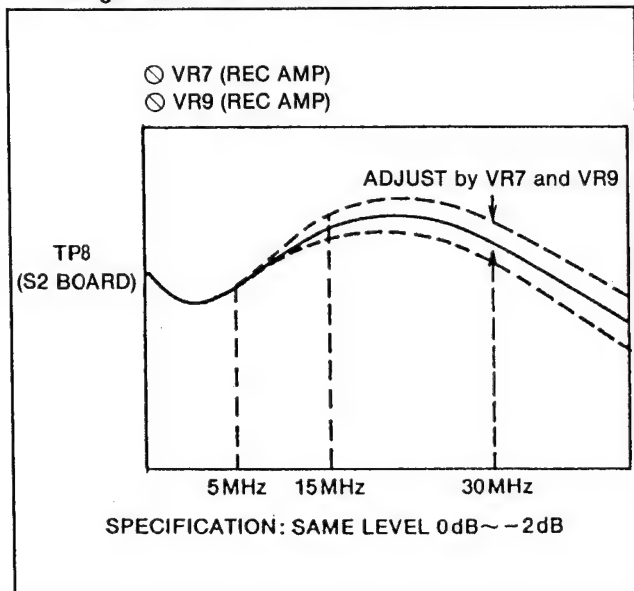


<STEP 8>

1. CH1B Rec Current Adjustment is same as CH1A which is described STEP 6-3 ~ STEP 7 (Just change the CH).

<STEP 9>

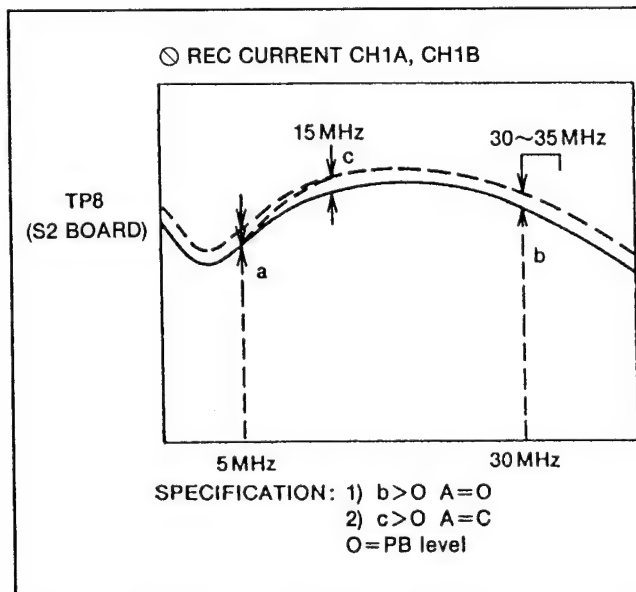
1. Adjust VR7 (CH1 A) and VR9 (CH1 B) so that the waveform level is same at 30MHz as shown below and confirm that the error rate on the front panel is minimum.
2. If it is not, set the CH1 B to -128 by using adjustment VR on the front panel. And adjust VR7 (CH1 A) so that the error rate is minimum and same level.
3. Adjust VR9 (CH1 B) so that the error rate is minimum by using the same method above.



<STEP 10>

1. If level is increased at 30MHz to 35MHz, adjust REC CURRENT CH1 A and CH1 B so that the output level at 5MHz is same level. (A:0).
2. If the level is increased at 5MHz, adjust REC CURRENT CH1 A and CH1 B so that the output level at 5MHz is same increasing value. (a:c).

Caution : Adjust point of VR7 and VR9 are as shown below.



<STEP 11>

1. Set the machine condition as follows.

VIDEO OUT → SET UP → STATE → [] (CURSOR CENTER)
[→] → [→] → [→] (EDIT REC) → TAPE →
MANUAL EDIT → INSERT

2. Set the VTR PLAY mode.
3. Confirm that the waveform level is same and error rate is minimum.

<STEP 12>

Set the AT HEIGHT Front Menu to all 0.

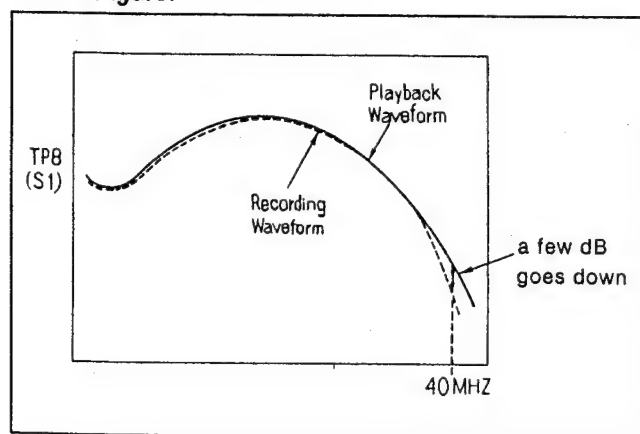
<STEP 13>

1. Save the REC CURRENT DATA as follows TEST MENU.
BS + F8 → F9 (Select USER) → F + F11 (SAVE)

Note: When save the data, REC CURRENT data display will be disappeared.

ADJUSTMENT KNOW HOW (INFORMATION)

1. Insert a cassette and place the unit in recording mode.
 2. Set the machine condition as follows.
TEST → RF → REC CURR → [] (CURSOR CENTER) → [→] → (REC CURR).
CH0 A, CH0 B CH1 A or CH1 B Heads are selected by cursor key [↑] [↓].
 3. Adjust each CH by using the adjustment VR on the front panel so that the output envelope is maximum and minimum error on the display.
- * In confidence mode, if adjust CH0 A, change the CH0 B envelope output. (CHA recording, CHB playback in confidence mode).
4. Adjust VR2, VR4, VR7 and VR9 on the REC AMP board so that the error rate is minimum.
 5. After this adjustment check the frequency characteristics waveforms by using the spectrum analyzer. Refer to the item 14-2 and 14-3.
 6. This specification is minimum error rate. (Inner Error rate is less than 4 on the display bar.)
 7. If out of specification check the frequency characteristic waveform by using the spectrum analyzer. Connect the spectrum analyzer to TP8 on the S1 board and play back the alignment tape (1) and memorize the frequency characteristic waveform.
 8. After memorize, place the unit in the recording mode.
 9. If output waveform is same as the playback waveform, readjust the VR612 and VR613 so that the output level goes down a few dB level around 40MHz portion and minimum error rate as shown in Figure.



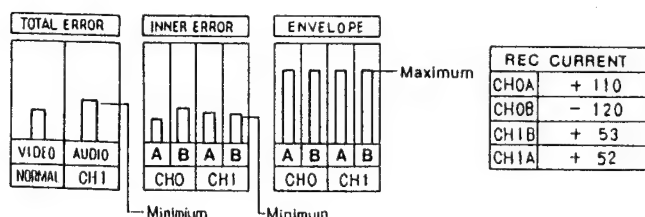
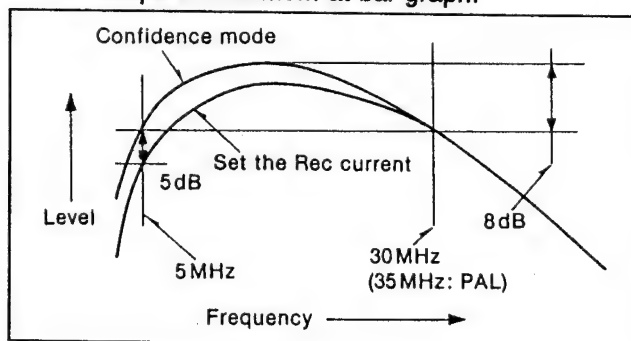
FINAL CONFIRMATION

SPEC	REFER TO FIGURE
TEST	TP8(S1,S2 BOARD), TP207(REC AMP BOARD) → EXT IN
MODE	REC mode
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	75% COLOR BAR SHUFFLING OFF ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (SP MENU) VR2, VR4, VR7, VR9

1. Set the spectrum analyzer as shown item 14-2.
2. Connect the spectrum analyzer to TP8.
3. Connect the EXT input of spectrum analyzer to TP207.
4. Place the unit in the recording mode and memorize the frequency characteristics waveform to VIEW B of the spectrum analyzer.
5. Set the Rec current of front panel so that the output spectrum of 5MHz goes down to -5dB.
6. Confirm that the output spectrum as shown in figure.
7. If it is not, readjust the Rec current of front panel and VR2, VR4, VR7 and VR9.

MIX point of Both Spectrum = 30MHz ± 3MHz

8. Confirm that the error rate is minimum and envelope is maximum at bar graph.



14.4. RF2 ENVELOPE DETECTION ADJUSTMENT

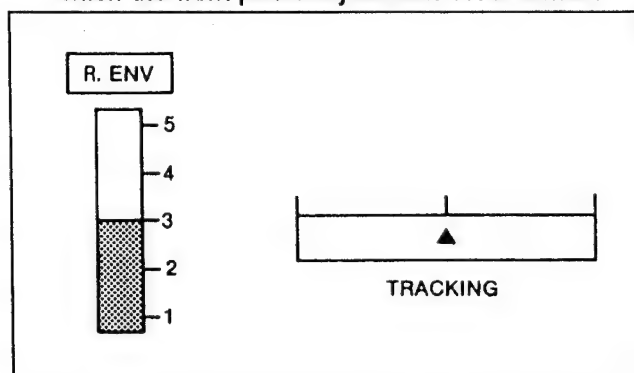
SPEC	MAX. ENVELOPE ON FRONT METER
TEST	FRONT METER OF TEST RF MENU
MODE	PLAY
TAPE	COLOR BAR SECTION OF ALIGNMENT TAPE
M.EQ	400MHz OSCILLOSCOPE
INPUT	
ADJ.	VR10[B3](CH1 OFF), VR12[B3](CH1 GAIN) VR5 [F1], VR11 [G1]

<STEP 1>

1. Set VR11 to center position.
2. SCOPE CH1 : TP1
CH2 : TP207 for Trigger
3. Adjust VR5 so that the DC voltage is $1.5V \pm 0.1V$.

<STEP 2>

1. Turn the VR10 fully colockwise.
2. Playback the alignment tape color bar portion.
3. Set the tracking FIX mode.
TEST → RF → TRACKING → FIX
4. Adjust VR12 so that the envelope meter shows 3.0 as shown in figure.
5. Set the tracking variable mode.
TEST → RF → TRACKING → VAR
Confirm the envelope meter value is changed when the front panel adjustment VR is turned.

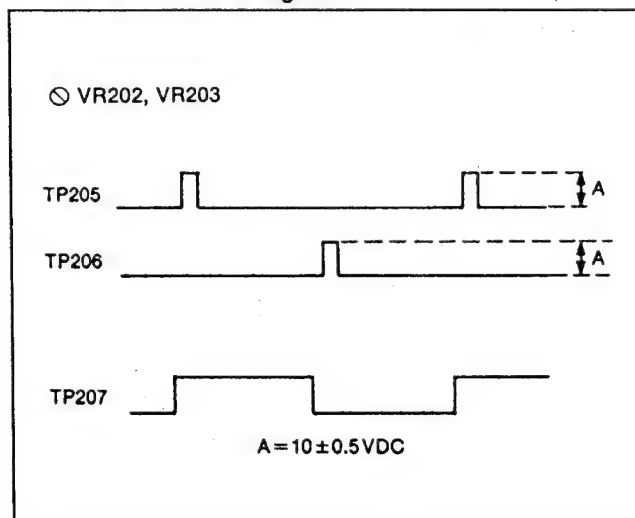


14.5. ROTARY ERASE ADJUSTMENT (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8 (S1 and S2)[E2], TP205[J5], TP206[K5],
MODE	AUDIO INSERT → VAR X 1
TAPE	BLANK TAPE
M.EQ	400MHz OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR202[O3], VR203[N1]

<STEP 1>

1. SCOPE CH2 : TP205
CH3 : TP206
CH4 : TP207
2. SCOPE TRIGGER : CH4
3. Disconnect the P504 and P511.
4. Set the "AUDIO INSERT" mode on MENU condition.
5. Place the unit in the Audio Insert mode. (PLAY → REC)
6. Adjust VR202 so that the DC voltage is $10 \pm 0.5V$ DC as shown in Figure.
7. Adjust VR203 so that the DC voltage is $10 \pm 0.5V$ DC as shown in Figure.

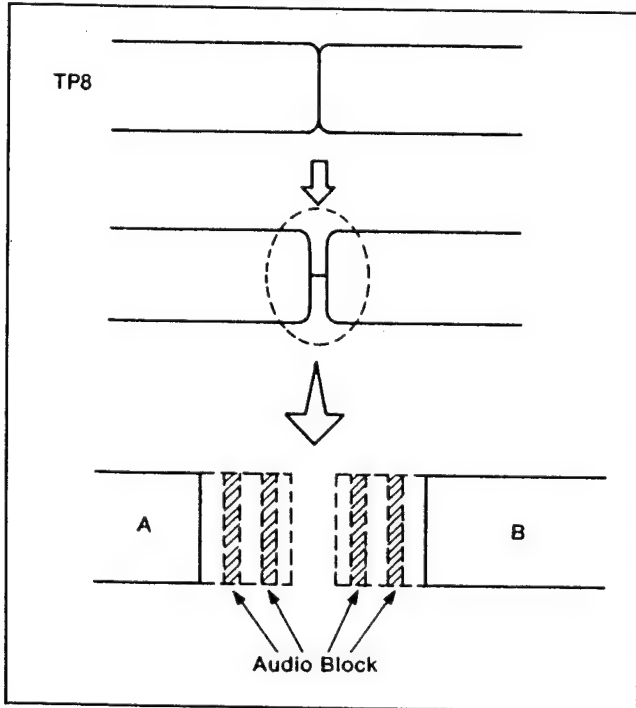


<STEP 2>

1. SCOPE CH1 : TP8/TPG5 (S1 board)
CH4 : TP207
2. Playback an after adjustment recorded portion on VAR X 1 mode.
3. Confirm that the Audio Block of envelope is erased as shown in Figure.

<STEP 3>

1. SCOPE CH1 : TP8/TPG5 (S2 board)
CH4 : TP207
2. Confirm that the envelope is within the above specification.
3. Re-connect the P504 and P511.



15. HEAD AMP REGULATOR BOARD

15-1. DC OUTPUT ADJUSTMENT (H.A REGURATOR)

SPEC	SV DC \pm 0.1V DC
TEST	TP5
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR
ADJ.	VR2

<STEP 1>

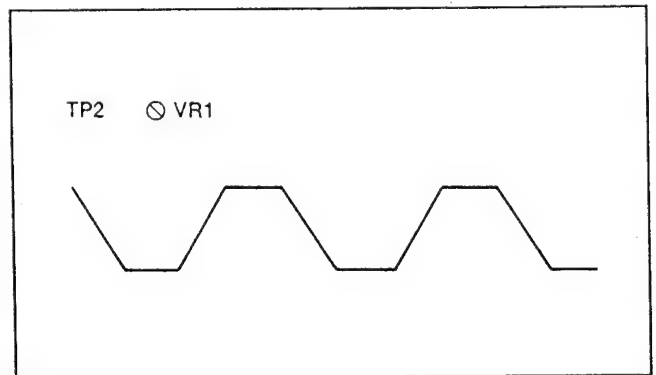
1. OSCILLOSCOPE : TP5
2. Adjust VR2 so that the adjust DC is 8V DC \pm 0.1V DC.

15-2. WAVEFORM SHADE ADJUSTMENT (H.A REGURATOR)

SPEC	AS SHOWN FIGURE
TEST	TP2
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR
ADJ.	VR1

<STEP 1>

1. OSCILLOSCOPE : TP2
2. Adjust VR1 so that the output waveform is as shown below.



16. VIDEO/AUDIO REC (L2) BOARD

16-1. PLL (1) ADJUSTMENT

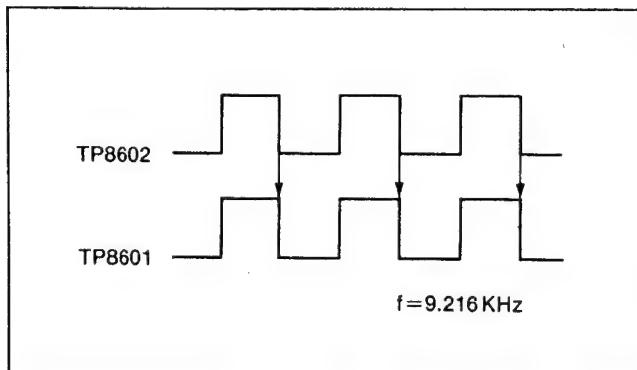
SPEC	AS SHOWN FIGURE
TEST	TP8602, TP8601
MODE	PITCH CONTROL $\pm 15\%$
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8601[B6]

<STEP 1>

- SCOPE CH1 : TP8602 (TRIGGER)
CH2 : TP8601
- MENU CONDITION
HOME MENU SET UP \rightarrow PRPL ON
Set the Program play to $\pm 15\%$
- Confirm that the waveforms are locked as shown in figure.

<STEP 2>

- If it is not, adjust VR8601 so that the waveform are locked.



16-2. PLL (2) ADJUSTMENT

SPEC	AS SHOWN FIGURE
TEST	TP8605, TP8604
MODE	PITCH CONTROL $\pm 15\%$
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8602[D5]

<STEP 1>

- SCOPE CH1 : TP8605 (TRIGGER)
CH2 : TP8604
- MENU CONDITION

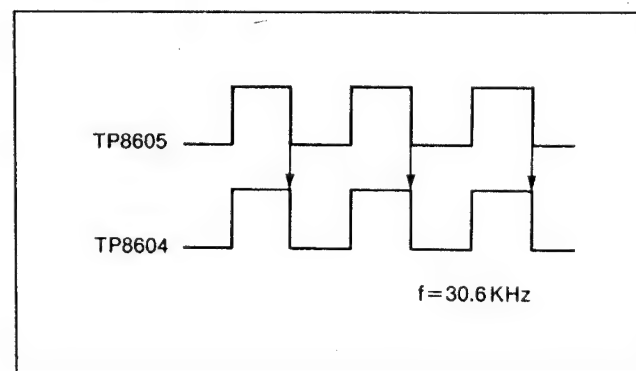
HOME MENU SET UP \rightarrow PRPL ON

Set the Program play to $\pm 15\%$

- Confirm that the waveforms are locked as shown in figure.

<STEP 2>

- If it is not, adjust VR8602 so that the waveform are locked.



16-3. PLL (3) ADJUSTMENT

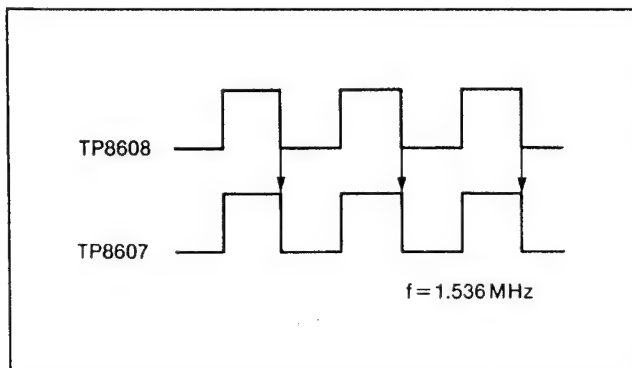
SPEC	AS SHOWN FIGURE
TEST	TP8608, TP8607
MODE	PITCH CONTROL $\pm 15\%$
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8603[D4]

<STEP 1>

- SCOPE CH1 : TP8608 (TRIGGER)
CH2 : TP8607
- MENU CONDITION
HOME MENU SET UP \rightarrow PRPL ON
Set the Program play to $\pm 15\%$
- Confirm that the waveforms are locked as shown in figure.

<STEP 2>

- If it is not, adjust VR8603 so that the waveform are locked.



17. SYSTEM CONTROL (S7) BOARD

SPEC	$2.00\text{V} \pm 0.01\text{V}$
TEST	TP1[B3]
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1[A4]

<STEP 1>

- MENU CONDITION
TEST \rightarrow RF \rightarrow REC CNT \rightarrow (cursor center)
- Memorize the REC current value and adjust the REC current value are +127 on the every channels.

<STEP 2>

- SCOPE CH1 : TP1
- Adjust VR1 so that the output level is $2.00\text{V} \pm 0.01\text{VDC}$.
- Reset the REC current value to original position.

ECTRUM ANALYZER SETUP (MODEL HP8591A)

1. SETUP --- REG 1

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) CENTER FREQUENCY	27.5MHz
(5) FREQUENCY SPAN	10MHz
(6) RES BW	100kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	30

2. SETUP --- REG 2

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) CENTER FREQUENCY	27.5MHz
(5) FREQUENCY SPAN	10MHz
(6) RES BW	100kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	30

3. SETUP --- REG 3

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) START FREQUENCY	20MHz
(5) STOP FREQUENCY	0MHz
(6) RES BW	300kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIMER	30msec
(9) TRIGGER	FREE RUM

4. SETUP --- REG 4

ITEM	PARAMETER
(1) REF LEVEL	-10dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	0MHz
(5) STOP FRQUENCY	50MHz
(6) RES BW	1MHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	10

5. SETUP --- REG 5

ITEM	PARAMETER
(1) REF LEVEL	-20dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	0MHz
(5) STOP FREQUENCY	50MHz
(6) RES BW	1kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)

6. SETUP --- REG 6

ITEM	PARAMETER
(1) REF LEVEL	-15dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	27.5MHz
(5) STOP FREQUENCY	0MHz
(6) RES BW	1MHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	200msec
(9) TRIGGER	EXT (HEAD SW)
(10)VID AVG	5

Electrical Adjustment

PAL

ELECTRICAL ADJUSTMENT PROCEDURES

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RECOMMEND TEST AND SERVICE EQUIPMENT

PART No.	NAME	REMARK
TSG273	DIGITAL COMPOSITE SIGNAL GENERATOR	TEKTRONIX
1411	COMPOSITE SIGNAL GENERATOR	TEKTRONIX
2467B	400MHz OSCILLOSCOPE	TEKTRONIX
1751	SCH METER	TEKTRONIX
521A	VECTOR SCOPE	TEKTRONIX
	DIGITAL VOLT METER	
	FREQUENCY COUNTER	
	VTVM	FREQUENCY BAND WIDTH 4Hz ~ 500KHz
	DIGITAL MULTI METER	
	DISTORTION METER	
HP8591A	SPECTRUM ANALYZER	HEWLETT PACKARD
	AUDIO ANALYZER (or RC OSCILLATOR)	
TYPE 5012	DIGITAL AUDIO SIGNAL GENERATOR	PRO-BEL

How to read a table for adjustment.

TEST	Test points for scope and [Location on the Board]
MODE	Set VTR this mode
TAPE	Alignment Tape portion or work tape
M.EQ	Measurement Equipment
INPUT	Input the signal to VTR specified here
ADJ.	Adjustment portion and [Location on the Board]

1.AUDIO A/D D/A, VIDEO D/A (L1) BOARD [AUDIO SECTION]

1-1.A/D REFERENCE LEVEL ADJUSTMENT

SPEC	0dBm \pm 0.05dB
TEST	TP302 (CH1)[C2], TP305 (CH2)[C3], TP312 (CH3)[C5], TP315 (CH4)[C7]
MODE	EJECT, EE2
TAPE	
M.EQ	VTVM
INPUT	1kHz 0dBm Sinewave Signal to AUDIO IN (CH1 to CH4)
ADJ.	VR301 (CH1)[B2], VR302 (CH2)[B3], VR304 (CH4)[B7]

4000 SERIES

<STEP 1>

MACHINE CONDITION

- 1.INPUT ATT SELECT SW 0dBm
(on the AUDIO IN/OUT Board)
- 2.OUTPUT ATT SELECT SW 0dBm
(on the AUDIO IN/OUT Board)
- 3.INPUT IMPEDANCE SW HIGH
(on the AUDIO IN/OUT Board)

<STEP 2>

MENU CONDITION

AUDIO IN MENU

Select the AUDIO INPUT LEVEL to "UNITY"

(CH1 ~ CH4 : F1 ~ F4)

<STEP 3>

1.VTVM:LINE OUT (CH1)

LINE OUT (CH2)

LINE OUT (CH3)

LINE OUT (CH4)

2.Adjustment VR:VR301 (CH1)

VR302 (CH2)

VR303 (CH3)

VR304 (CH4)

SPECIFICATION:

VR301, VR302:0dBm \pm 0.05dB

VR304, VR303

<STEP 4>

1.VTVM:TP301 (CH1)

TP302 (CH2)

TP303 (CH3)

TP304 (CH4)

2.Confirm that the Audio level is within the specification
as shown.

SPECIFICATION :+9.30dBm \pm 0.5dB

<STEP 5>

1.VTVM:TP303 (CH1)

TP306 (CH2)

TP313 (CH3)

TP316 (CH4)

2.Confirm that the Audio level is within the specification
as shown.

SPECIFICATION:-9.7dBm \pm 0.2dB

1-2.AUDIO OUTPUT LEVEL ADJUSTMENT

SPEC	0dBm \pm 0.2dB
TEST	LINE OUT : (CH1), (CH2), (CH3), (CH4) (MONI LCH), (MONI RCH)
MODE	EJECT, EE2
TAPE	
M.EQ	VTVM
INPUT	1kHz 0dBm Sinewave Signal to AUDIO IN (CH1 to CH4)
ADJ.	VR601 (CH1)[F2], VR602 (CH2)[G2], VR603 (CH3)[I2], VR604 (CH4)[J2], VR605 (MONI LCH)[K2], VR606 (MONI RCH)[M2]

<STEP 1>

MENU CONDITION

AUDIO IN MENU

Select the AUDIO INPUT

LEVEL to "OFF" : F7 (EMPHASIS)

<STEP 2>

1. VTVM : CH1 LINE OUT
CH2 LINE OUT
CH3 LINE OUT
CH4 LINE OUT
MONI LCH OUT
MONI RCH OUT

2. Adjustment VR : VR601 (CH1)
VR602 (CH2)
VR603 (CH3)
VR604 (CH4)
VR605 (MONI LCH)
VR606 (MONI RCH)

(SPECIFICATION)

Each CH Output Level : +0dBm \pm 0.5dB

Note: If there is some noise at monitor out, please
adjust L601 ~ L606, L201.

1. AUDIO A/D D/A, VIDEO D/A (L1) BOARD [VIDEO SECTION]

MENU CONDITION
AUDIO IN MENU
Select the VIDEO INPUT F3 to "DIGITAL"

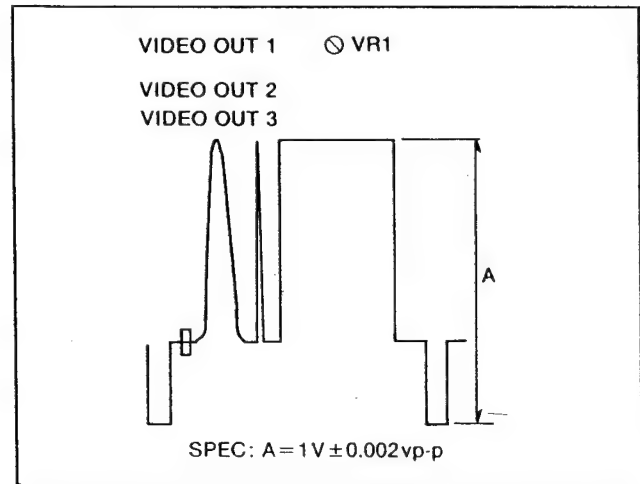
VIDEO OUT SET UP MENU
Select the VIDEO STANBY OFF to "EE2"
STANBY OFF
VIDEO : EE2

1-1. VIDEO OUTPUT LEVEL ADJUSTMENT (L1 : VIDEO D/A)

SPEC	1V ± 0.002Vpp
TEST	VIDEO 1 OUT, VIDEO 2 OUT, VIDEO 3 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	PULSE & BAR to DIGITAL IN
ADJ.	VR1 (D/A LEVEL)[A8]

- <STEP 1>
1. SCH METER : VIDEO 1 OUT
 2. Adjust VR1 so that the Video level "A" is 1V ± 0.002Vp-p as shown in Figure.

- <STEP 2>
1. SCH METER : VIDEO 2 OUT
VIDEO 3 OUT
 2. Confirm that the Video level "A" is 1V ± 0.002Vp-p.

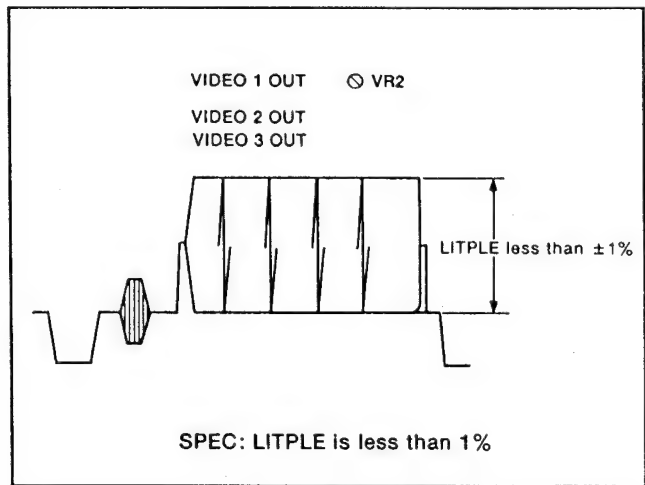


1-2. VIDEO OUTPUT FREQUENCY ADJUSTMENT (1) (L1 : VIDEO D/A)

SPEC	LITPLE
TEST	VIDEO 1 OUT, VIDEO 2 OUT, VIDEO 3 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL H SWEEP to DIGITAL IN
ADJ.	VR2 [L8]

- <STEP 1>
1. SCH METER : VIDEO 1 OUT
 2. Adjust VR2 so that the Frequency Response is flat as shown in Figure.

- <STEP 2>
1. SCH METER : VIDEO 2 OUT
VIDEO 3 OUT
 2. Confirm that the Frequency Response is flat as shown in Figure.



1-3. VIDEO OUTPUT FREQUENCY ADJUSTMENT (2) (L1 : VIDEO D/A)

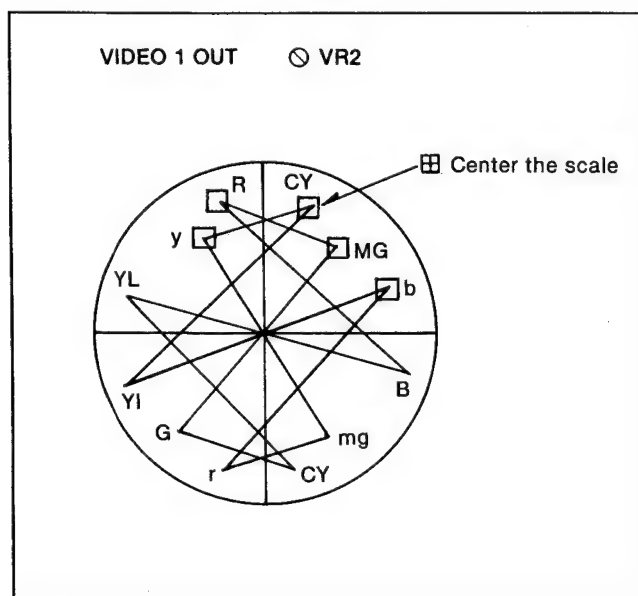
SPEC	CENTER OF THE SCALE
TEST	VIDEO 1 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	VECTOR SCOPE
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR2 [L8]

<STEP 1>

1. VECTOR SCOPE : VIDEO 1 OUT
2. Adjust VR2 so that the each vector is in center the scale of Vector Scope.

<STEP 2>

1. Confirm that the each vector position is in the box of vector when put back the LI board into the VTR.



1-4. VIDEO OUTPUT DC LEVEL ADJUSTMENT (L1 : VIDEO D/A)

SPEC	$0V \pm 20mV$
TEST	TP4 [J8]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR4 (CLAMP DC LEV)[L7]

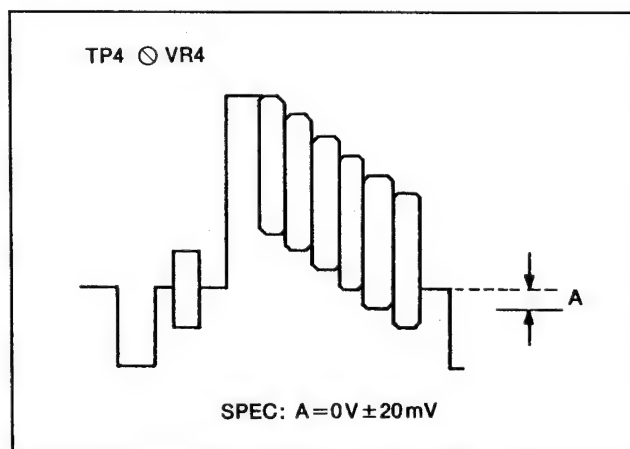
<STEP 1>

MACHINE CONDITION

Connect the 75Ω termination to VIDEO 1 OUT.

<STEP 2>

1. SCOPE : TP4
2. Adjust VR4 so that the Pedestal DC level is $0V \pm 20mV$ as shown in Figure.

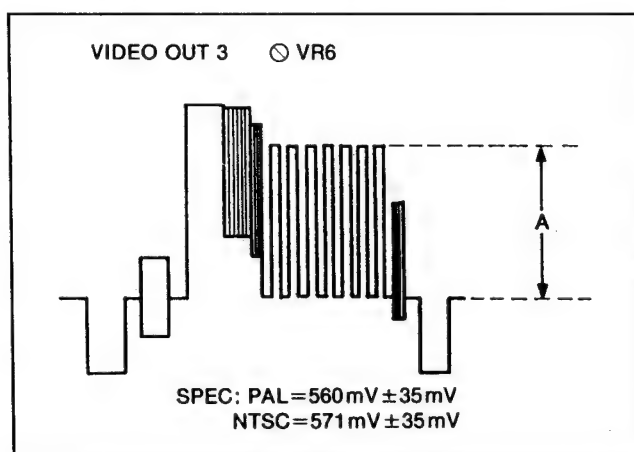


1-5. CHARACTER LEVEL ADJUSTMENT (L1 : VIDEO D/A)

SPEC	560mV \pm 35mV
TEST	VIDEO 3 OUT (SUPER)
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR6 (CHAR LEVEL)[J8]

<STEP 1>

1. SCH METER : VIDEO 3 OUT
2. Adjust VR6 so that the Character level "A" is 80IRE \pm 5IRE as shown in Figure. NTSC=571mV \pm 35mV.



1-6. WFM OUTPUT LEVEL ADJUSTMENT (L1 : VIDEO D/A)

SPEC	1V \pm 0.002Vpp
TEST	WFM OUTPUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR5 (RET V LEVEL)[L6]

<STEP 1>

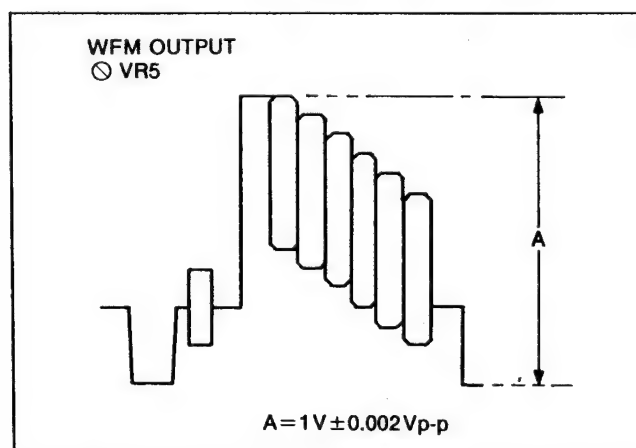
MENU CONDITION

VIDEO OUT MENU : F9

Select the WFM to A.INPUT

<STEP 2>

1. SCH METER : WFM OUTPUT
2. Adjust VR5 so that Input level "A" is 1V \pm 0.002Vp-p as shown in Figure.



<STEP 3>

MENU CONDITION

VIDEO OUT MENU : F9

Select the WFM to "OUTPUT"

<STEP 4>

1. SCH METER :WFM OUTPUT
2. Confirm that the Output level "A" is 1V \pm 0.002Vp-p as shown in Figure.

Refer to above Figure in <STEP 2>

4. VIDEO PROCESS (L4) BOARD

Adjustment with this section, perform after completed adjustment with L1 section.

MENU CONDITION 1

AUDIO IN MENU

Select the VIDEO INPUT F3 to "ANALOG"

VIDEO OUT SET UP MENU

Select the VIDEO STANBY OFF to "EE2"

STANBY OFF

VIDEO : EE2

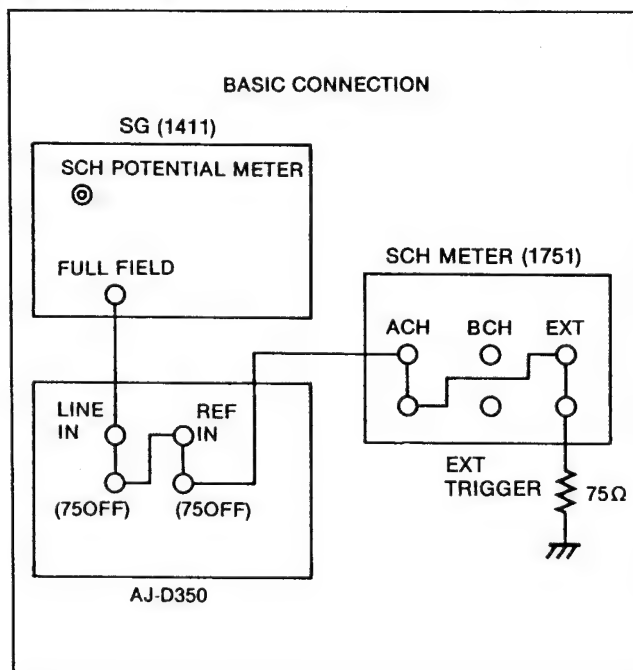
MENU CONDITION 2

TEST MENU

VIDEO FUNCTION

Press the SCH F10 Key on the Front Panel and display the OUT REF SCH METER.

MACHINE CONDITION (SET UP CONDITION 1)

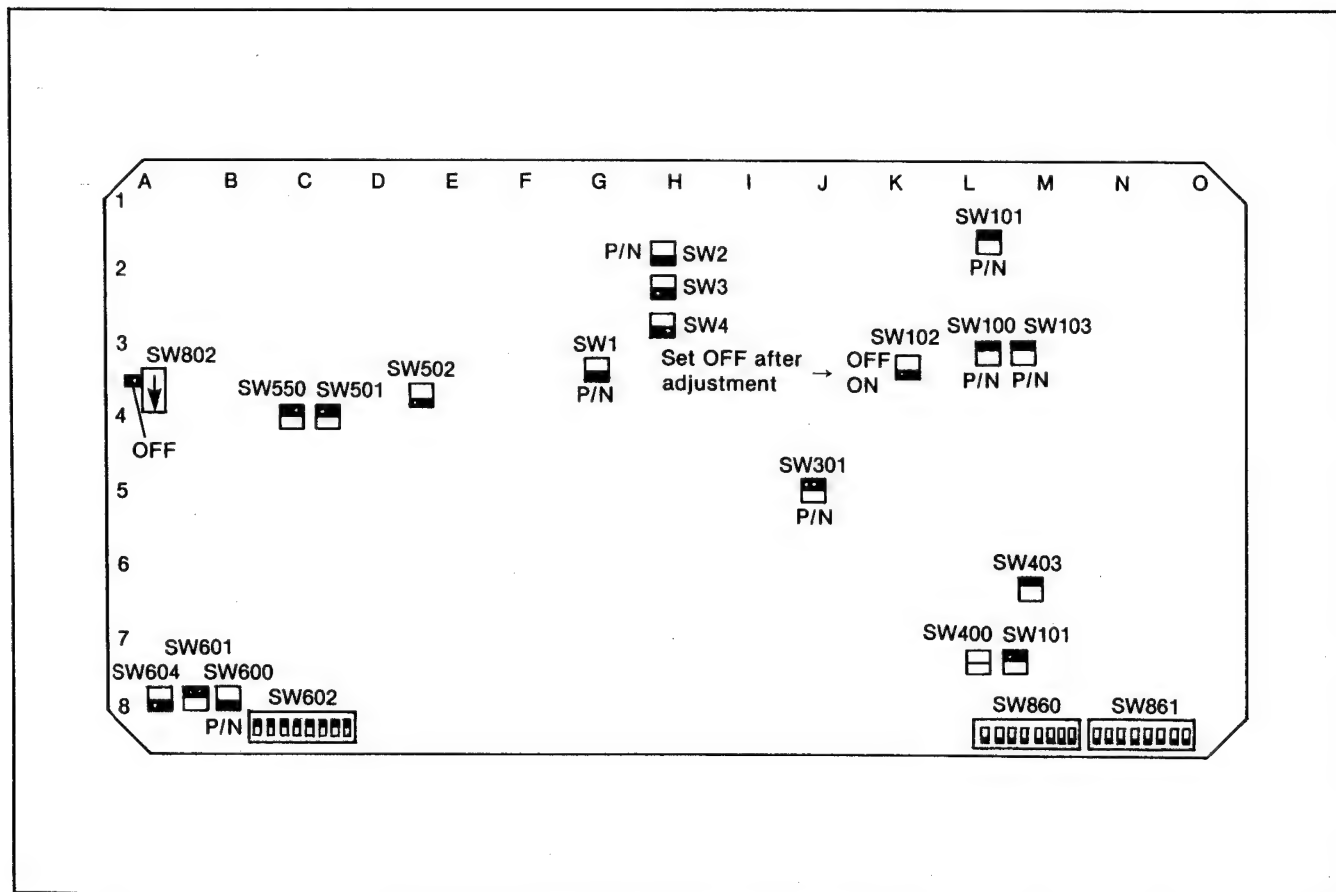


ADJUSTMENT SECTION

4-7. SCH METER ADJUSTMENT

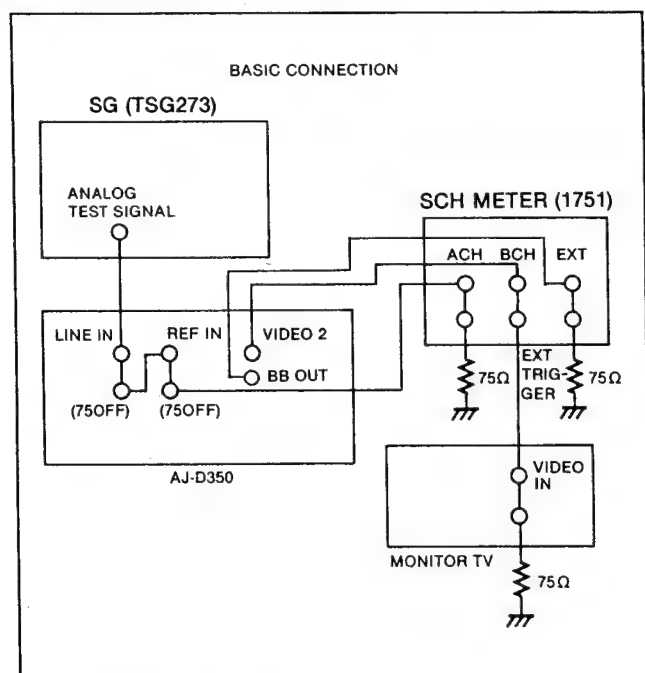
4-9. REF CF DETECTION (3) ADJUSTMENT

4-6. REF SCH ADJUSTMENT



SWITCH POSITION IS BLACK SIDE

MACHINE CONDITION (SET UP CONDITION 2)

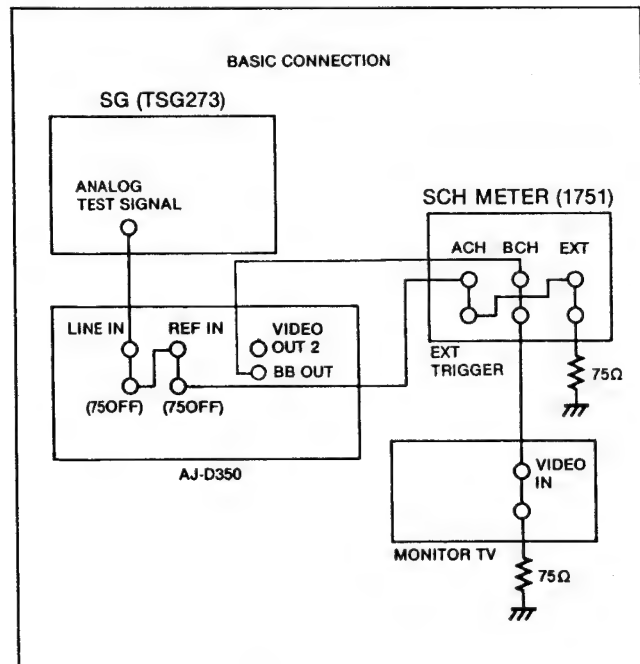


ADJUSTMENT SECTION

4-11. SYS SC PHASE ADJUSTMENT

4-12. SYS SC PHASE (2) ADJUSTMENT

MACHINE CONDITION (SET UP CONDITION 3)



ADJUSTMENT SECTION

4-13. BB OUT SYNC LEVEL ADJUSTMENT

4-14. BB OUT SC PHASE ADJUSTMENT

4-15. BB OUT SCH ADJUSTMENT

4-16. BB OUT H PHASE (1) ADJUSTMENT

4-17. BB PIT H PHASE (2) ADJUSTMENT

4-18. BB OUT BURST LEVEL ADJUSTMENT

4-19. BB OUT BURST POSITION & WIDTH ADJUSTMENT

4-1. BF PULSE POSITION ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	BURST IS CENTER OF BF PULSE
TEST	TP9[I1], TP1[I3], TP3[G3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	70% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR1 (BF POS)[F3]

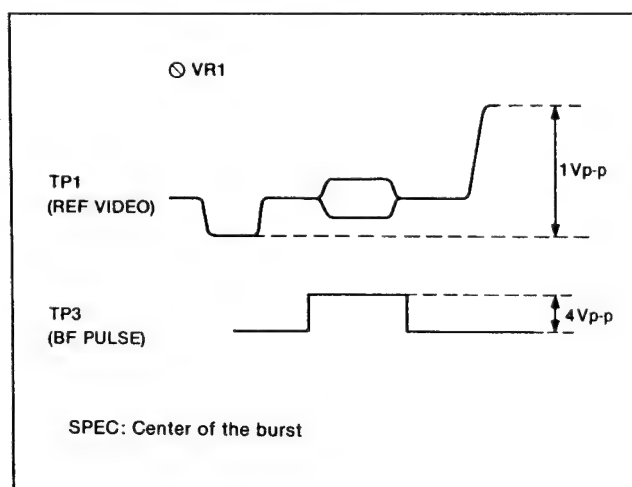
8000 SERIES

<STEP 1>

- SCOPE : TP9
- Confirm that the DC voltage is $2.25 \pm 0.1V$ DC

<STEP 2>

- SCOPE CH1 : TP1
CH2 : TP3
- Adjust VR1 so that the BF pulse is centered on the burst signal as shown in Figure.

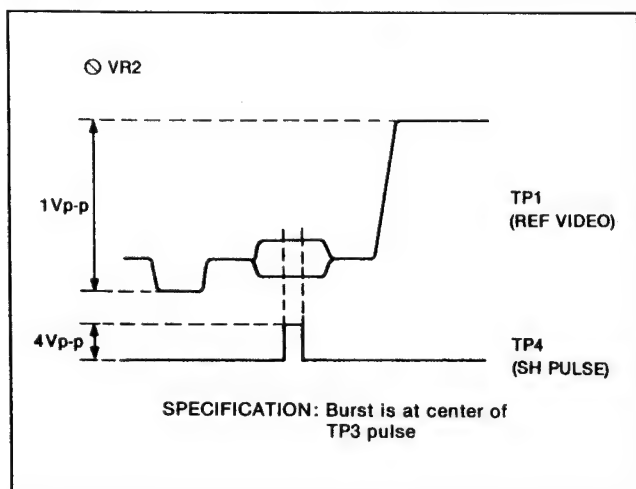


4-2. SH PULSE POSITION ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	SH PULSE IS CONTER OF BURST
TEST	TP1[I3], TP4[G3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR2 (SH POS)[F3]

<STEP 1>

- SCOPE CH1 : TP1
CH2 : TP4
- Adjust VR2 so that the SH pulse is located at center of the burst signal as shown in Figure.



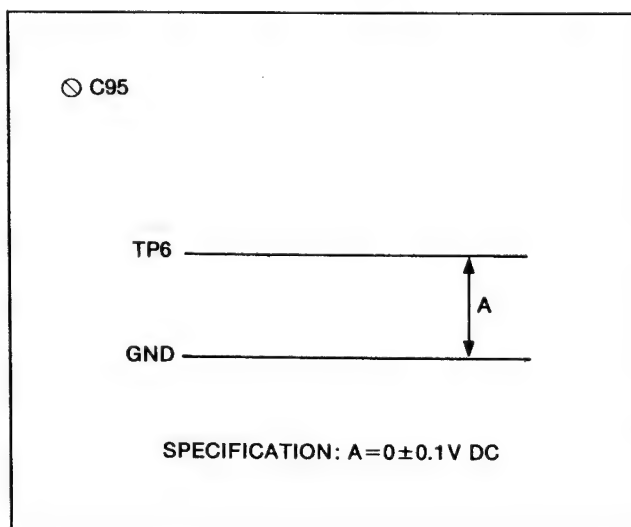
4-3. REF PLL ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	0V \pm 0.1V DC
TEST	TP6 [I2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	C95 (REF CLK FREQ)[I1]

8000 SERIES

<STEP 1>

- SCOPE CH1 : TP6
- Adjust C95 so that the DC voltage is 0 \pm 0.1V DC.



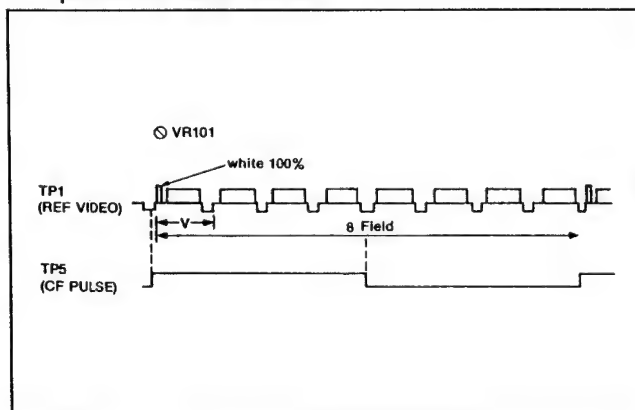
4-4. REF CF DETECTION ADJUSTMENT (1) (L4 : VIDEO PROCESS)

TEST	TP1 [I3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG273 FLAT FIELD to VIDEO IN and REF VIDEO IN
ADJ.	VR100 (SCH DET 1)[L1], VR101 (SCH DET 2)[M1], VR102 (LEVEL DET)[L2]

8000 SERIES

<STEP 1>

1. Confirm that the jumper SW102 is set to ON side.
2. SCOPE CH1 : TP1
CH2 : TP5
3. Set the VR100 and VR102 to center position.
4. Adjust VR101 so that the CF Pulse rise on head portion of color frame.



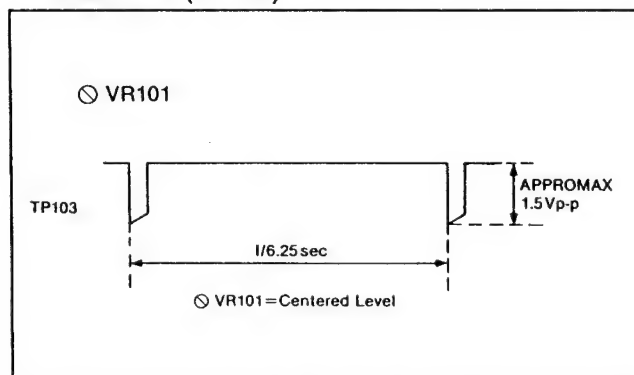
4-5. REF SCH DETECTION ADJUSTMENT (1) (L4 : VIDEO PROCESS)

TEST	TP5 [H2], TP103 [M3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG273 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR101 (SCH DET 2)[M1], VR100 (SCH DET 1)[L1]

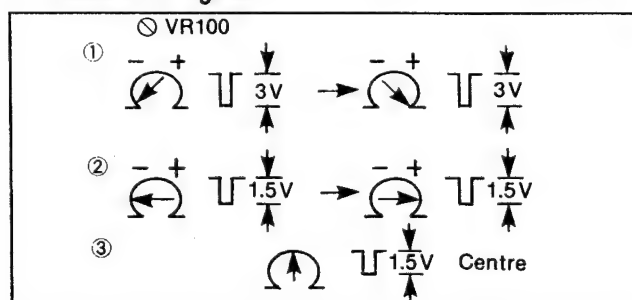
8000 SERIES

<STEP 1>

1. SCOPE CH1 : TP103
CH2 : TP5
2. Confirm that pulse signal of TP103 level is changed, when turn VR101 to clockwise or counter-clockwise.
3. Adjustment VR101 so that the pulse at TP103 is centered level between minimum (0V) and maximum (2 ~ 3V).



4. If VR101 is rotated too much, pulse position may be appeared at center of the pulses and color frame phase may be inverted.
5. Adjust VR100 so that the center between left and right side position which keep about 1.5V as shown in figure.



4-6. SCH METER ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	SCH METER DISPLAYED +45°
TEST	OUT REF SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1411 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR105 (SCH GAIN)[K4], VR106 (SCH OFFSET)[K4]

8000 SERIES

<STEP 1>

MACHINE CONDITION

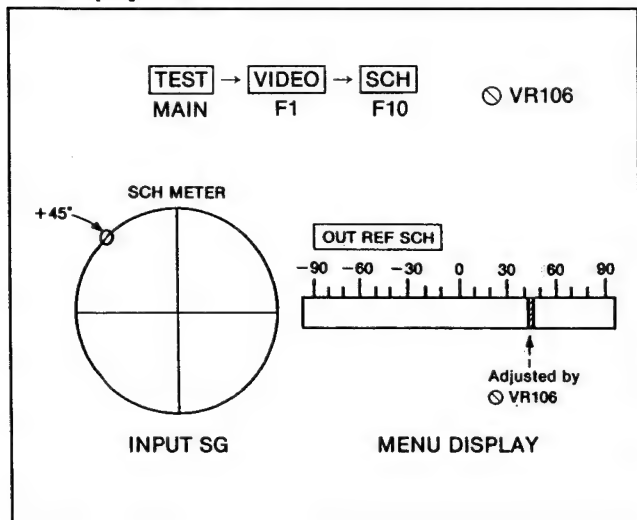
Refer to figure shown below.

<STEP 2>

1. Set VR105, VR106 to center position.
2. SCH METER : SCH MODE
3. Adjust the Potention Meter VR on 1411 so that the SCH phase becomes +45° at SCH METER.(Page 6)
4. Display the OUT REF SCH METER as follows.

TEST → F1 VIDEO → F10 SCH

5. Adjust VR106 so that the OUT REF SCH METER displayed +45°.

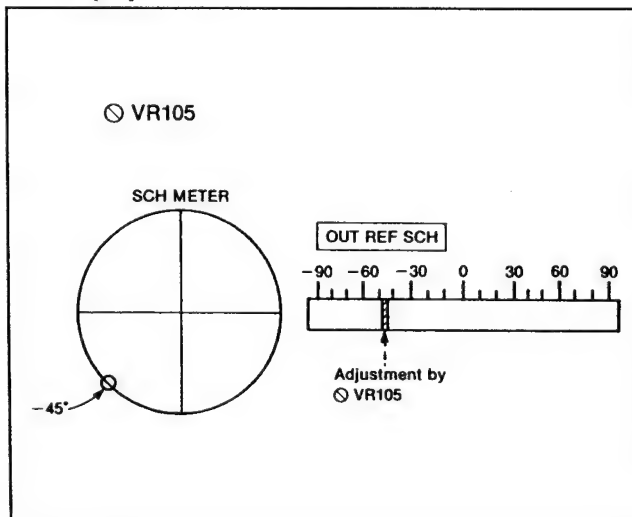


<STEP 3>

1. Adjust the Potention Meter VR on 1411 so that the SCH phase becomes -45° at SCH METER.
2. Display the OUT REF SCH METER VR follows.

TEST → F1 VIDEO → F10 SCH

3. Adjust VR105 so that the OUT REF SCH METER displayed -45°.



<STEP 4>

1. Re-adjust above <STEP 2> and <STEP 3> until stabilize the position of VR105 and VR106.

4-7. REF CF DETECTION ADJUSTMENT (2)

SPEC	SHOWN BELOW
TEST	OUT REF SCH Meter on TEST VIDEO Menu
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	1411 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR101 (SCH DET 2) [M1]

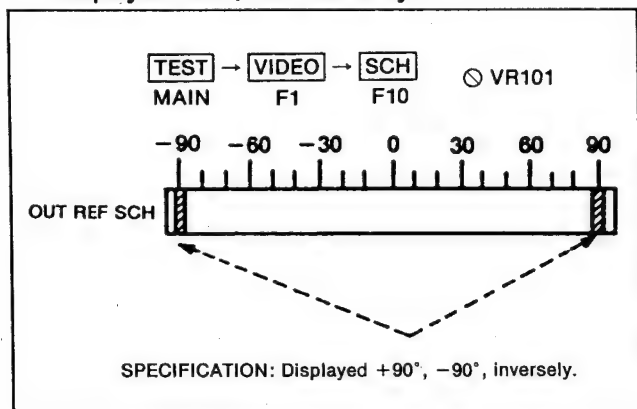
<STEP 1>

MACHINE CONDITION

Refer to SET UP CONDITION 1

<STEP 2>

1. Adjust the Potention Meter VR on 1411 so that the OUT SCH is displayed -90°.
2. Precisely adjust VR101 so that the OUT SCH displayed +90°, -90° inversely.



4-8. REF SCH DETECTION ADJUSTMENT (2) (L4 : VIDEO PROCESS)

SPEC	TP105 = TP104 ± 20mV
TEST	TP104[L3], TP105[J3], TP106[J3]
MODE	EE2 (EJECT), SW102 [K3] ON (DOWN)
TAPE	
M.EQ	SCH METER (OSCILLOSCOPE)
INPUT	1410 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR103 (SCH -L)[J2], VR104 (SCH -H)[J2]

8000 SERIES

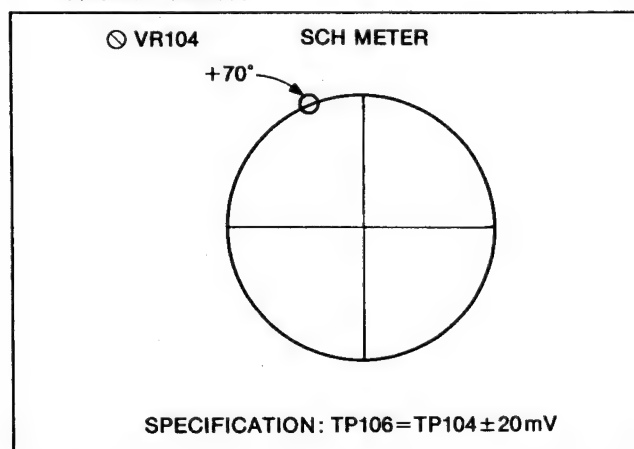
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.(Page 6)

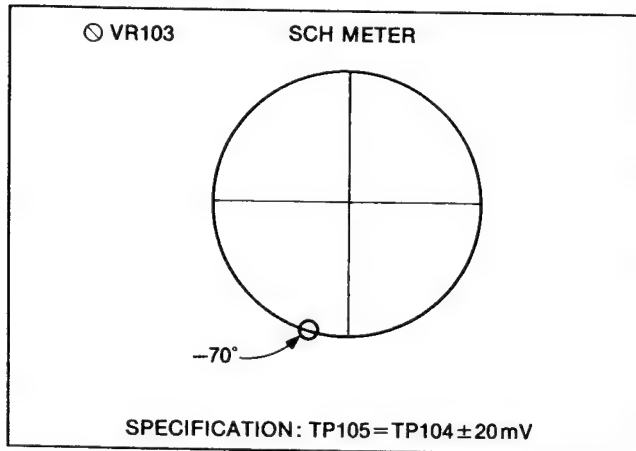
<STEP 2>

1. SCH METER : SCH MODE
2. Adjust the Potention Meter VR on 1411 so that the SCH phase becomes +70° at SCH METER.
3. SCOPE CH1 : TP106
CH2 : TP104
4. Measure the voltage at TP104.
5. Adjust VR104 so that the DC voltage at TP106 is TP104 ± 20mV.



<STEP 3>

1. Adjustment the Potention Meter VR on 1411 so that the SCH phase becomes -70° at SCH METER.
3. SCOPE CH1 : TP105
CH2 : TP104
4. Measure the voltage at TP104.
5. Adjust VR103 so that the DC voltage at TP105 is $TP104 \pm 20mV$.



<STEP 4>

1. Set SW102 to OFF (UP).

4-9. REF SCH DETECTION ADJUSTMENT (3) (L4 : VIDEO PROCESS)

SPEC	SCH METER IS 0°
TEST	OUT REF SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN, SCH = 0°
ADJ.	VR101 (SCH DET 2)[M2]

8000 SERIES

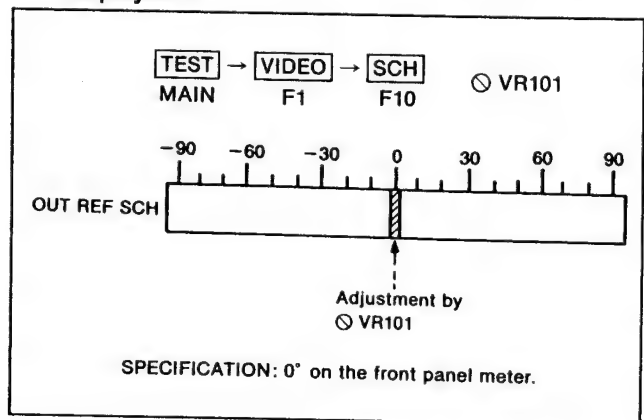
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.

<STEP 2>

1. Confirm the test signal generator output SCH is 0° .
2. Turn the power OFF and ON.
3. Display the OUT REF SCH METER on TEST VIDEO MENU.
4. Adjust VR101 so that the OUT REF SCH METER displayed 0° .



4-10. SYS PLL ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	TP108 = $2.5V \pm 50mV$ DC
TEST	TP108[K2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR108[K2]

8000 SERIES

<STEP 1>

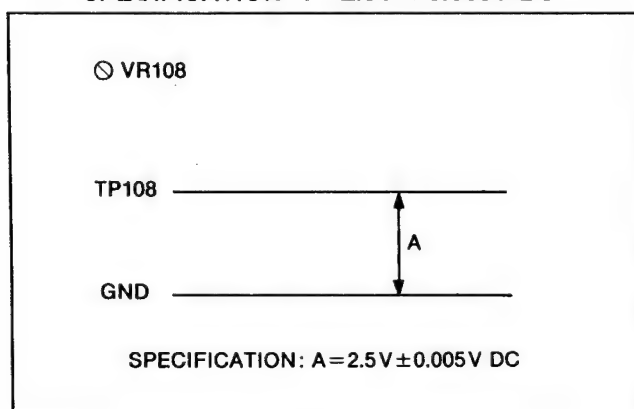
MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.

<STEP 2>

- SCOPE : TP108
- Adjust VR108 so that the DC voltage is $2.5V \pm 0.005V$ DC.

SPECIFICATION : $2.5V \pm 0.005V$ DC



4-11. BB OUT SYNC LEVEL ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	SYNC = $300mV_{pp}$ (VR202) MINIMUM CARRIER LEAKAGE (VR203)
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR202 (BB SYNC GAIN)[O3], VR203 (BB C LEVEL)[N1]

8000 SERIES

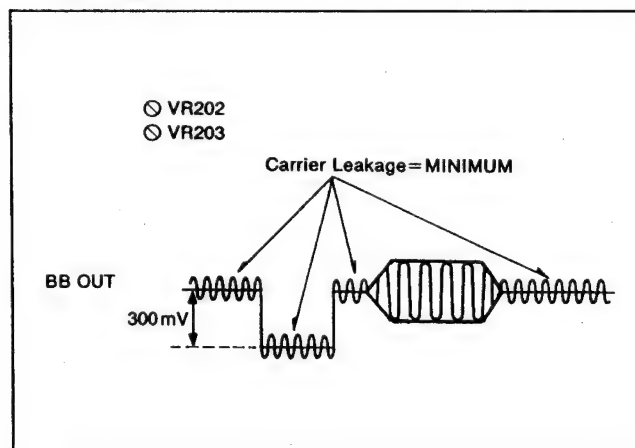
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

<STEP 2>

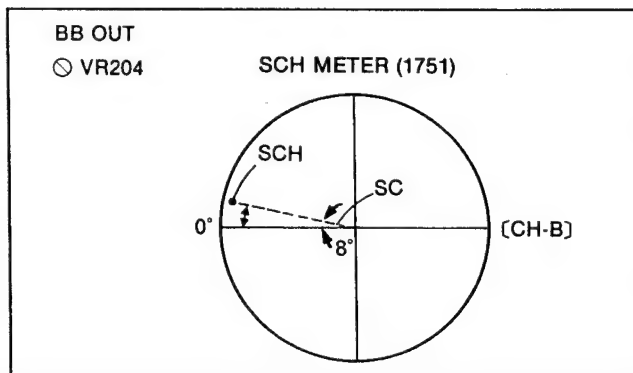
- SCH METER : WFM mode
- SCH METER INPUT : CHA : SG.VIDEO
CHB : BB OUT
- Adjust VR202 so that the Sync level of BB is $300mV$ as shown in Figure. Confirm the sync level is same with CHA (SG Video sync level).
- Adjust VR203 so that the carrier leak is become minimum.



4-12. BB OUT SC PHASE ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	REF VIDEO BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM, SCH MODE)
INPUT	ANALOG 75% COLOR BAR to VIDEO IN
ADJ.	VR204 (BB C PHASE)[O3], VR3 (H POS 1)[G3], VR5 (H POS 2)[F1]

8000 SERIES



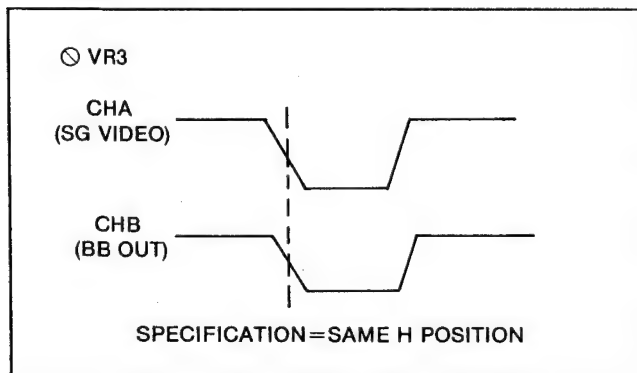
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

<STEP 2>

1. SCH METER : WFM mode, EXT trigger
2. SCH METER INPUT : CHA : SG VIDEO
CHB : BB OUT
3. Adjust VR3 so that the H phase of BB out is same H sync phase with CHA (SG VIDEO) at training center position. This is a coarse adjustment of VR3.



<STEP 3>

1. SCH METER : SCH mode, EXT trigger
CHA : SG VIDEO
CHB : BB OUT
2. Set the SCH meter CHA position at correct position. Select SCH meter to CHB.
3. Adjust VR5 so that the SCH of B.B out delayed +8° against REF IN.
4. Adjust VR204 so that the burst phase delayed +8° against burst on CHA.
5. +8° delay is caused by extension board. The SCH becomes 0° when L4 board is returned to VTR.

4-13. SYS SC PHASE ADJUSTMENT (2)
 (L4 : VIDEO PROCESS)

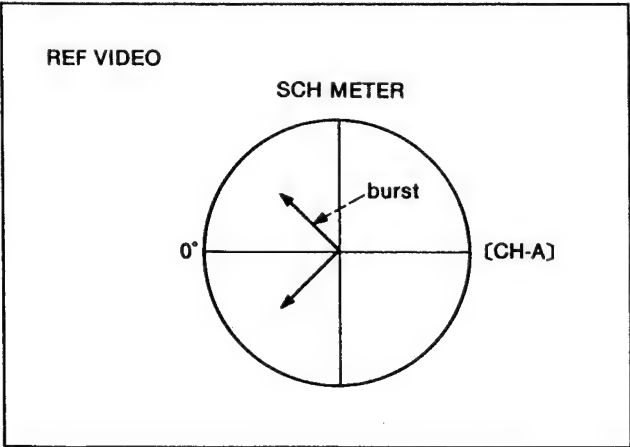
SPEC	REF IN BURST PHASE - VIDEO OUT 2 BURST PHASE
TEST	VIDEO OUT 2
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR107 (SYS SC PHASE)[J2]

8000 SERIES

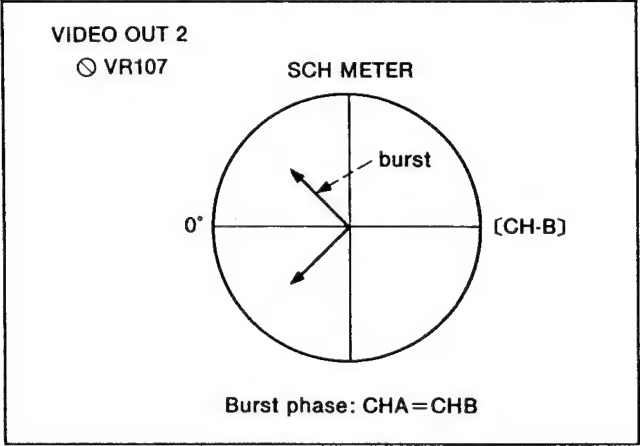
<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 2 at the beginning of this SECTION.

<STEP 2>
MENU CONDITION
VIDEO OUT MENU : F7
Select the SC to "UNITY" mode.

<STEP 3>
1. SCH METER : SCH : MODE
2. SCH INPUT : CHA
3. Adjust the phase VR on SCH METER so that the burst phase becomes standard position at SCH METER.



<STEP 4>
1. SCH INPUT : CHB
2. Adjustment VR107 so that the burst phase becomes the same phase as REF VIDEO (CHA).



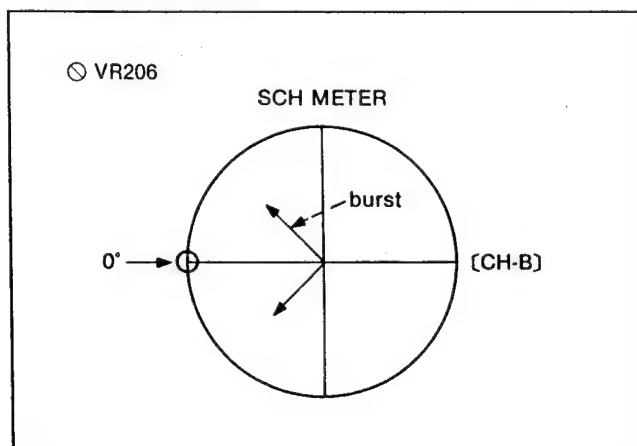
4-14. BB OUT SCH ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	BB OUT SCH = 0°
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR206 (H POS 2 PAL) [N2]

8000 SERIES

<STEP 1>

1. SCH METER : WFM mode
2. SCH METER INPUT : CHB
3. Adjust the Phase VR on SCH METER so that the burst phase becomes standard position at SCH METER.
4. Adjust VR206 so that the SCH phase becomes 0° at SCH METER.



4-15. BB OUT H PHASE ADJUSTMENT (1) (L4 : VIDEO PROCESS)

SPEC	REF VIDEO IN H PHASE - BB OUT H PHASE
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR3 (H POS 1) [G3]

8000 SERIES

<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.

<STEP 2>

1. SCH METER : WFM mode
2. SCH METER INPUT : CHA REF VIDEO
CHB BB OUT
3. Adjust VR3 so that H phase is the same phase against the H phase on CHA.

Note: Adjust VR3 so that the H phase is Value of center stability condition.

4-16. BB OUT H PHASE ADJUSTMENT (2) (L4 : VIDEO PROCESS)

SPEC	TP304 PULSE RATIO IS SAME
TEST	TP303[G3], TP304[H2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR3 (H POS 1)[G3]

8000 SERIES

<STEP 1>

MACHINE CONDITION

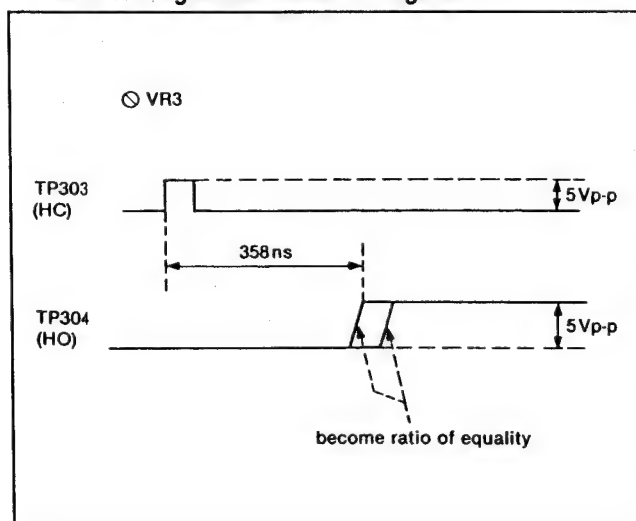
Refer to SET UP Condition 3 at the beginning of this SECTION.

<STEP 2>

1. SCH METER : WFM mode
2. Confirm that the BB OUT H phase at SCH METER.

<STEP 3>

1. SCOPE CH1 : TP303
CH2 : TP304
2. SCOPE TRIGGER : CH1
3. Adjust VR3 so that the relation between HC signal and H0 signal as shown in Figure.



4-17. BB OUT BURST LEVEL ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	BB OUT BURST = 30mVpp
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR205 (BB BS GAIN)[O2]

8000 SERIES

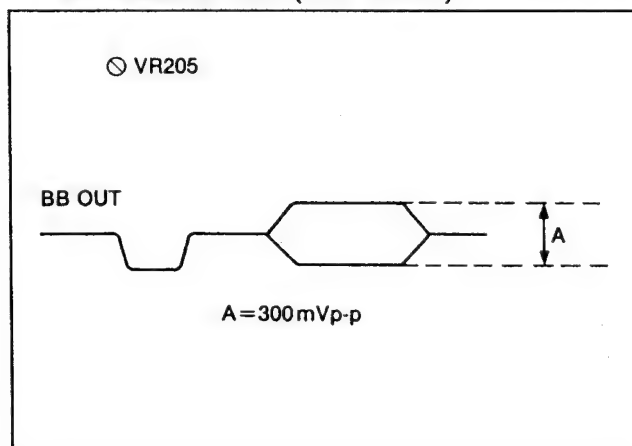
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

<STEP 2>

1. SCH METER : WFM mode, EXT trigger
2. SCH METER INPUT : CHA : SG VIDEO
CHB : BB OUT
3. Adjust VR205 so that the burst level is 300mVp-p.
4. Confirm that the CHB (BB OUT) H phase and burst level on CHA (REF VIDEO).



4-18. BB OUT BURST POSITION & WIDTH ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	REF BURST POSITION = BB BURST POSITION
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR200 (BB BS POS)[N1], VR201 (BB BS WIDTH)[N1]

8000 SERIES

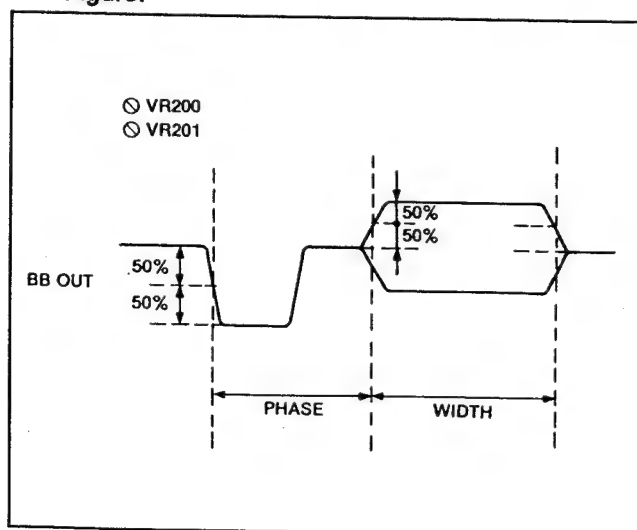
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.

<STEP 2>

1. SCH METER : WFM mode
2. Adjust VR200 so that the phase of SYNC (CHB) is mach with the REF signal (CHA) as shown in Figure.
3. Adjust VR201 so that the width of burst (CHB) is match with the REF signal (CHA) as shown in Figure.



4-19. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (1) (L4 : VIDEO PROCESS)

SPEC	CF LOCK
TEST	TP5[H2], TP1[I3], VIDEO OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	FLAT FIELD 50% to VIDEO IN and REF VIDEO IN
ADJ.	CONFIRMATION

8000 SERIES

<STEP 1>

1. Confirm that the adjustment of L2 and S9 sections are completed.

<STEP 2>

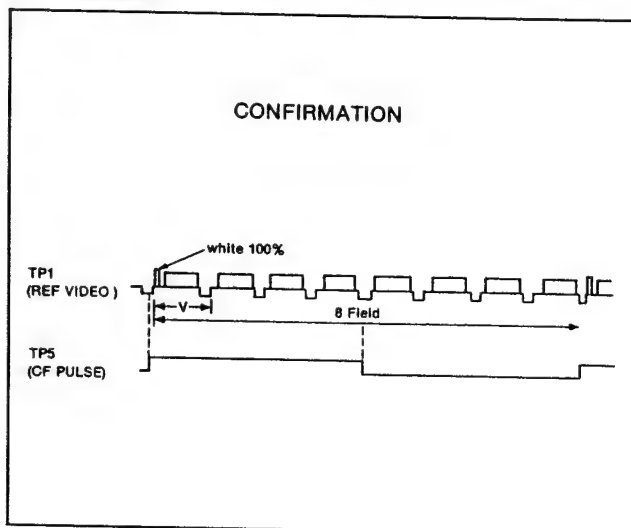
MENU CONDITION

HOME MENU SET UP

Select the OUT REFERENCE to "INCOM".

<STEP 3>

1. SCOPE CH1 : TP1
CH2 : TP5
2. Confirm that the relation between REF VIDEO and CF pulse is as shown in Figure.
3. If the ID WHITE 100% signal does not appeared on indicated position as shown in Figure, Re-adjustment with INCOME CF DETECTION Adjustment (1), (2) and (4) of S9 Board adjustment Section.



4-20. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (2) (L4 : VIDEO PROCESS)

TEST	VIDEO OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	TSG273 COLOR BAR to VIDEO IN and VIDEO IN
ADJ.	VR4 (IH POS)[I4]

8000 SERIES

<STEP 1>

1. Confirm that the adjustment with L2 and S9 sections completed.

<STEP 2>

MENU CONDITION

HOME MENU SET UP

Select the OUT REFERENCE to "INCOM".

<STEP 3>

MACHINE CONDITION

Refer to SET UP CONDITION 2 at the beginning of this SECTION.

<STEP 4>

1. SCH METER : WFM Mode
2. Adjust VR4 so that the H phase on CHB is matched REF signal (CHA).

4-21. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (3) (L4 : VIDEO PROCESS)

SPEC	TP304 EQUAL RATIO
TEST	TP303 [G3], TP304 [H2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR4 (IH POS)[I4] (FINE)

8000 SERIES

<STEP 1>

1. Confirm that the adjustment with L2 and S9 sections completed.

<STEP 2>

MENU CONDITION

HOME MUNU SET UP

Select the OUT REFERENCE to "INCOM".

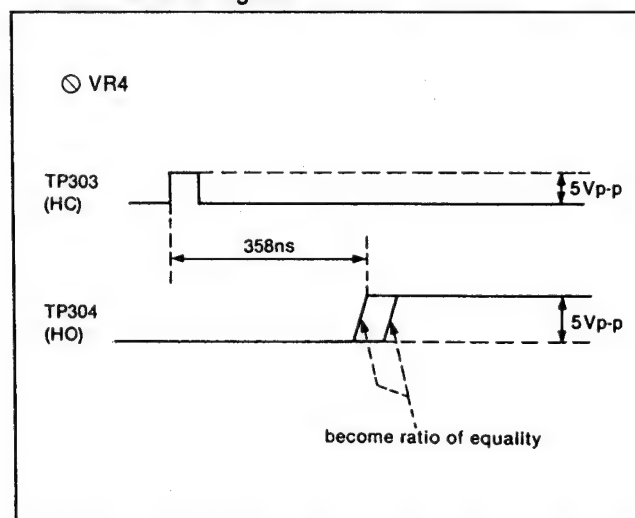
<STEP 3>

MENU CONDITION

Refer to SET UP CONDITION 2 at the beginning of this SECTION.

<STEP 4>

1. SCOPE CH1 : TP303
CH2 : TP304
2. SCOPE TRIGGER : CH1
3. Adjust VR4 so that the relation between HC signal as shown in Figure.



4-22. DIGITAL VIDEO OUT CLOCK PHASE ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	DIGITAL VIDEO OUT 25PIN D-SUB
MODE	EE1
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR to VIDEO IN and VIDEO IN
ADJ.	SW860 [M8], SW861 [M8]

8000 SERIES

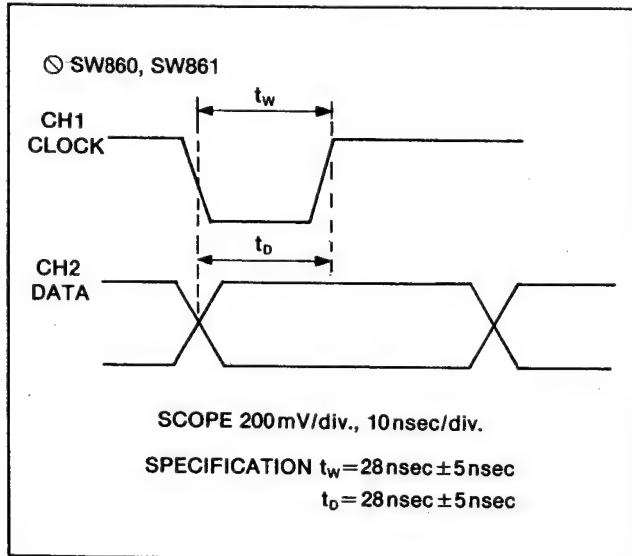
<STEP 1>

SCOPE CH1 : DIGITAL VIDEO OUT
D-SUB 1Pin
SCOPE CH2 : DIGITAL VIDEO OUT
D-SUB 7Pin

<STEP 2>

Adjust SW860 and SW861 so that the clock and data phase is shown in figure.

- (1) Set SW861-7bit to ON and SW860 -2 bit to ON or set SW861-8bit to ON and set one of the bit of SW861 bit1 - bit5 to ON.



5. REC/PLAY CH0 (S1) BOARD REC/PLAY CH1 (S2) BOARD

Adjust procedure with S1 and S2 board the same.

MACHINE CONDITION

Set the SW51 on the L2 board to OFF as shown in Figure 1.

Turns Line and Field shuffle off.

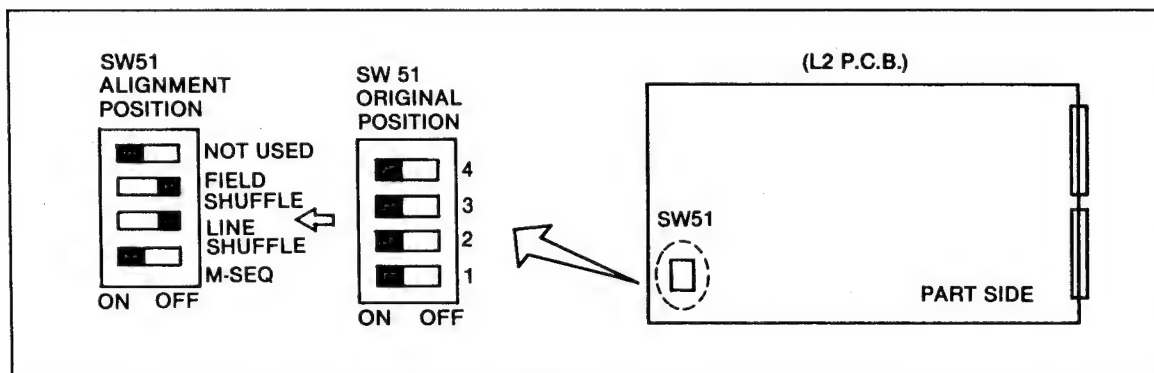


Figure 1.

1. Set the SW1, 2, 3 and 4 on the L3 P.C.B. follow the Figure 2.
2. Set the SW802 on the L4 P.C.B. follow the Figure 2.
3. Confirm that the 5 LED's are turned ON.

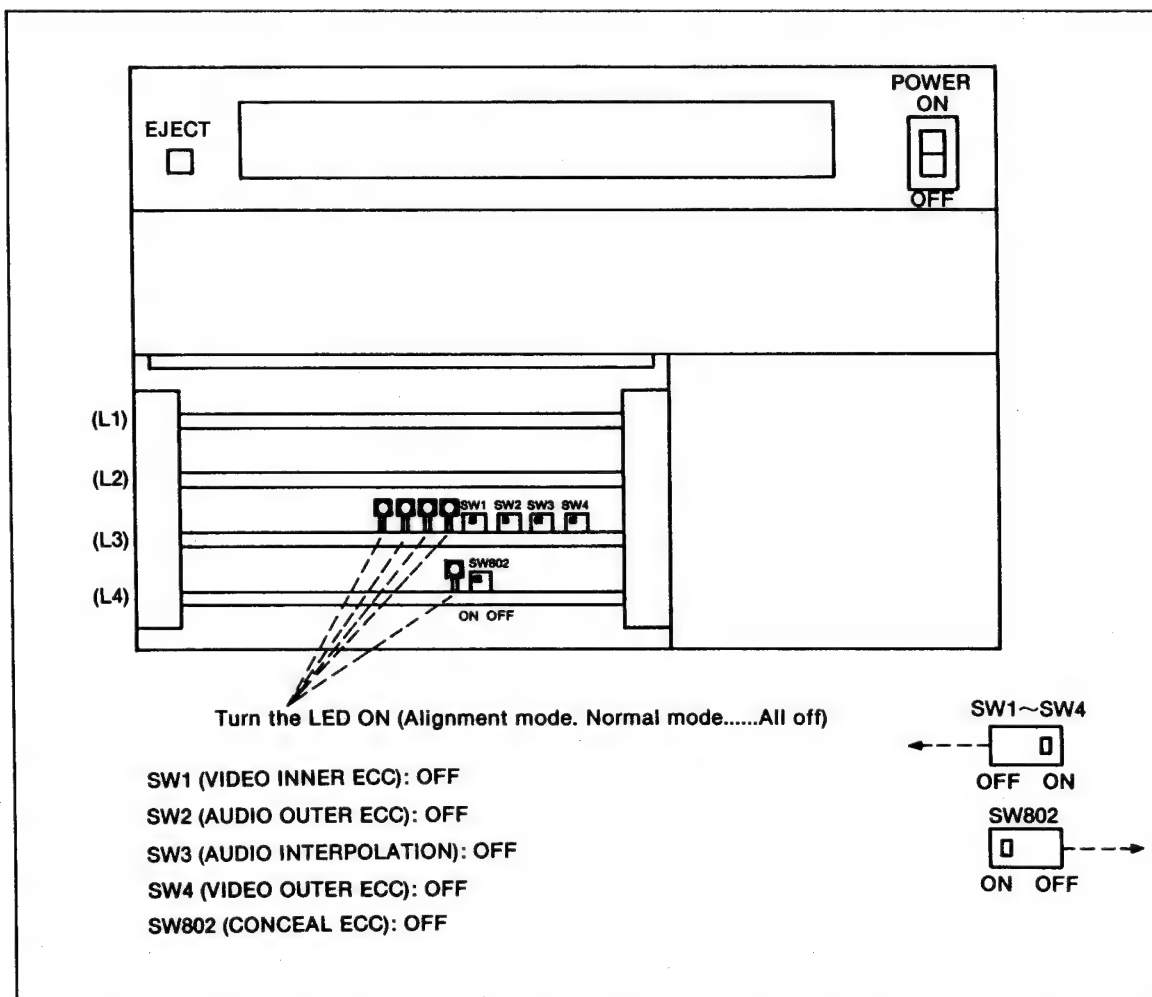


Figure 2.

Set the Dip SW's on the S1 and S2 P.C.B. follow the as shown in Figure 3.

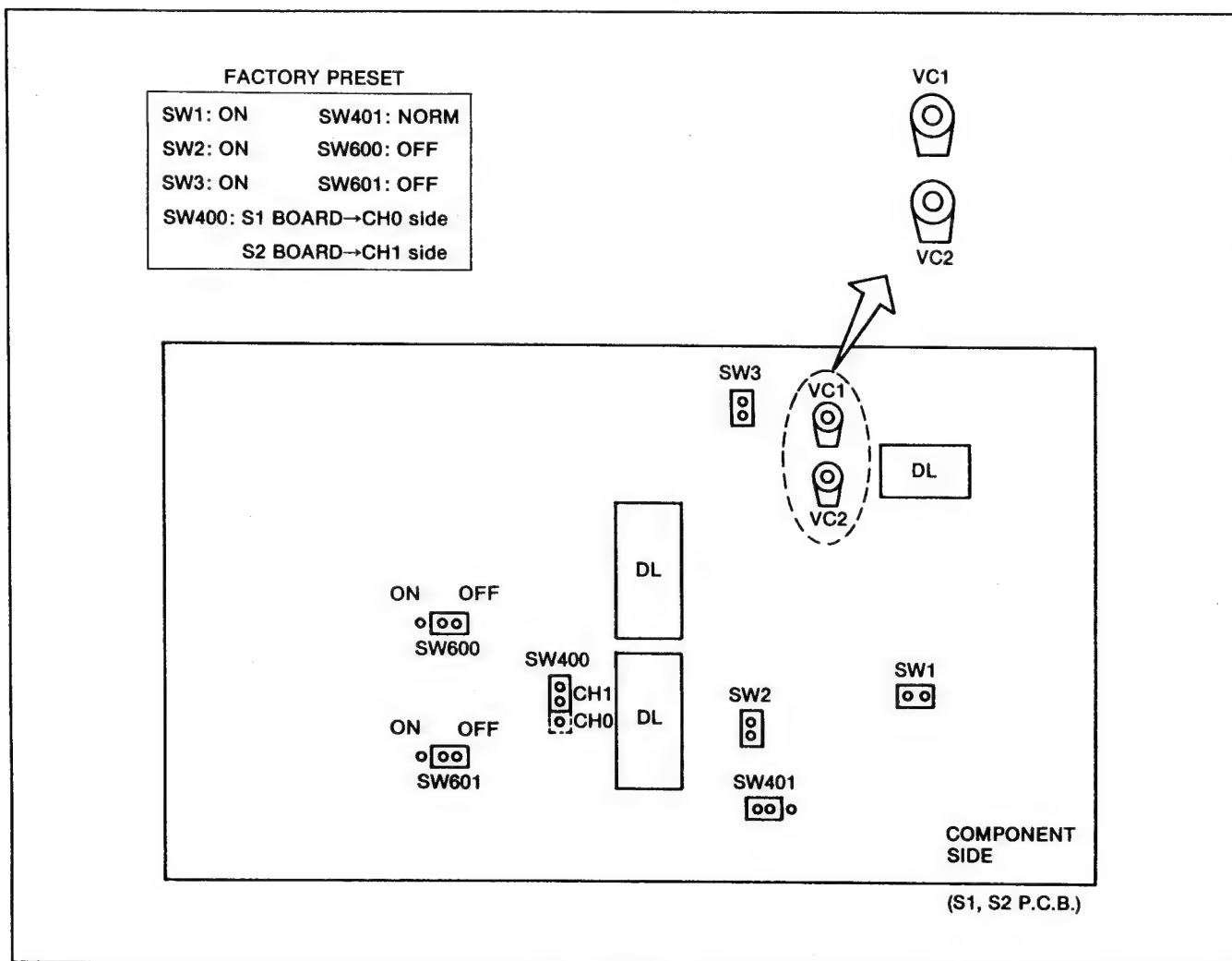
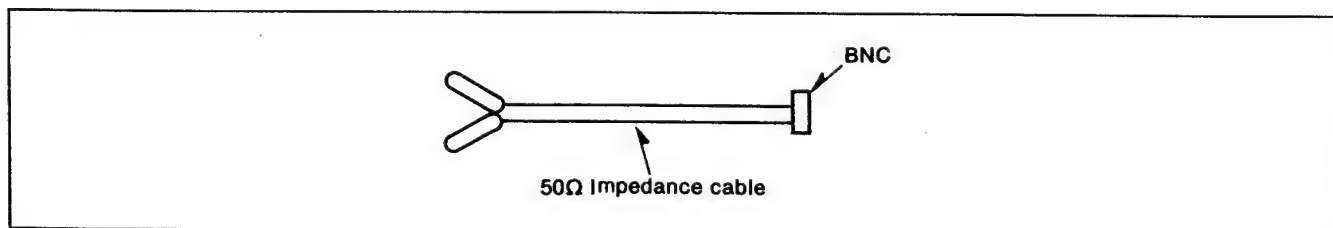
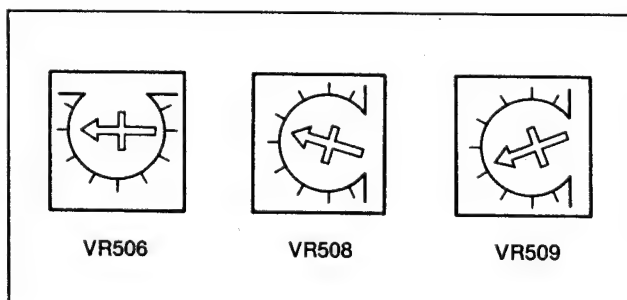


Figure 3.



NOTE :

1. These VRs are not used as follows.
VR600,VR601,VR602,VR603,VR604,
VR605,VR606,VR607,VR614,VR615
2. Set the VR506, VR508 and VR509 as follows.



5-1. PLL ADJUSTMENT

(S1 : REC/PLAY CH0)

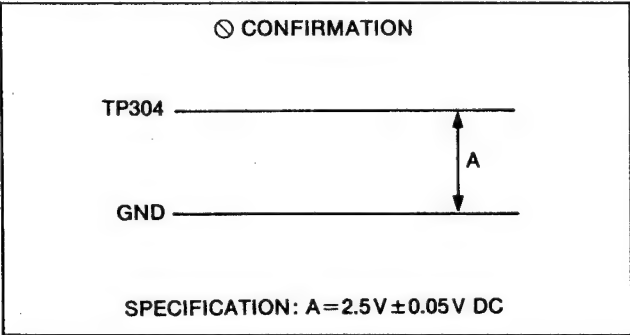
(S2 : REC/PLAY CH1)

<STEP 1>

SPEC	TP304 = 2.5V DC \pm 0.05V DC
TEST	TP304 [A1]
MODE	VIDEO OUT SET UP STATE EE2, STBY OFF
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	

5000 SERIES

- SCOPE : TP304
- Set VTR into STAND BY OFF mode.
- Confirm that the DC voltage is $2.5 \pm 0.05V$ DC. If it is not confirm the Servo HT (Head Tape relative speed) signal on S5 board.



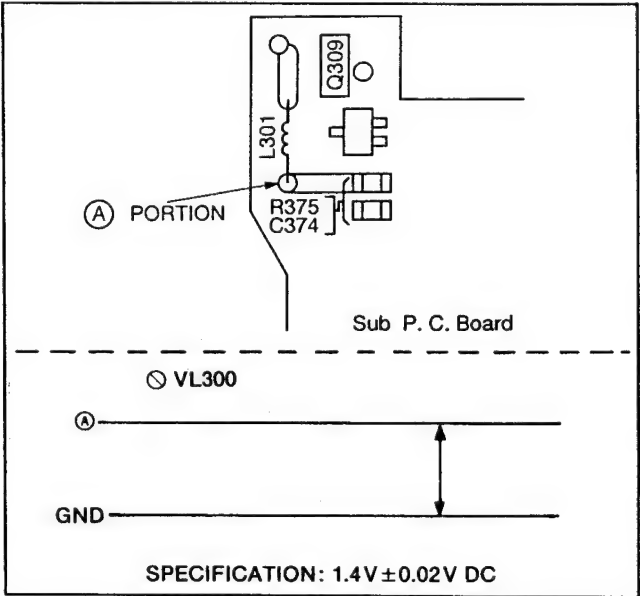
PLL ADJUSTMENT

<STEP 2>

SPEC	1.4V DC \pm 0.02V
TEST	L301 lower side in shield case
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VL300 (OSC OFFSET)[B1]

5000 SERIES

- SCOPE: L301 lower side
- Adjust VL300 (OSC OFFSET) so that the voltage is $1.4 \pm 0.02V$ DC.



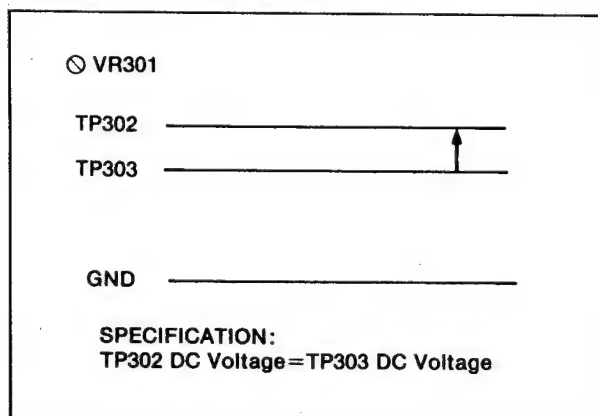
PLL ADJUSTMENT

<STEP 3>

SPEC	TP303 DC VOLT - TP302 DC VOLT
TEST	TP302 [C1], TP303 [B1]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR300 (PLL OFFSET)[A1]

5000 SERIES

1. SCOPE CH1 : TP302
CH2 : TP303
2. Adjust VR300 (PLL OFFSET) so that the voltage of TP302 and TP303 are same.



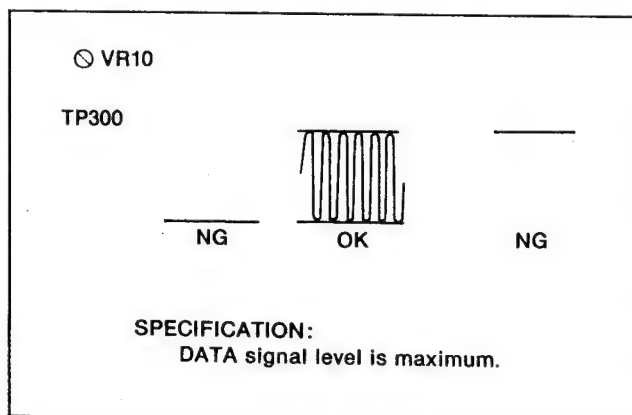
PLL ADJUSTMENT

<STEP 4>

SPEC	TP300 IS MAXIMUM PEAK TO PEAK
TEST	TP300 [B2]
MODE	TAPE mode STBY OFF
TAPE	COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR10 (COMP BIASE)[F1]

5000 SERIES

1. Insert an adjustment tape color bar portion.
2. Set the STBY OFF status to "TAPE" mode.
VIDEO OUT SET UP TAPE
3. Set the VTR into STBY OFF mode.
4. SCOPE : TP300
5. Adjust VR10 (COMP BIASE) so that the data signal level is maximum.

Note: Set the 20MHz Filter of oscilloscope to OFF mode.

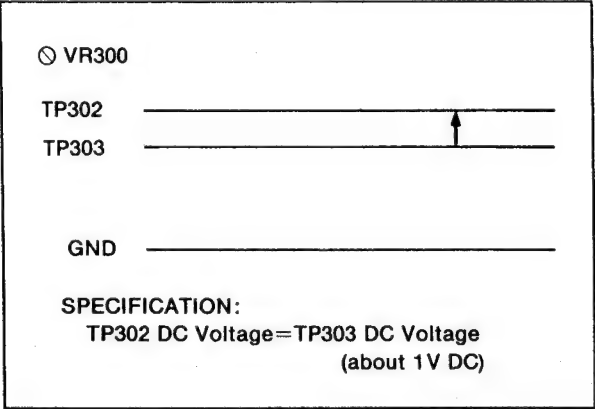
PLL ADJUSTMENT

<STEP 5>

SPEC	TP302 DC VOLTAGE = TP303 DC VOLTAGE
TEST	TP302 [B1], TP303 [B1]
MODE	TAPE mode STBY OFF
TAPE	COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR301 (DC BALANCE)[C1]

5000 SERIES

- SCOPE CH1 : TP302
CH2 : TP303
- Adjust VR301 (DC BALANCE) so that the voltage of TP302 and TP303 are same.



PLL ADJUSTMENT

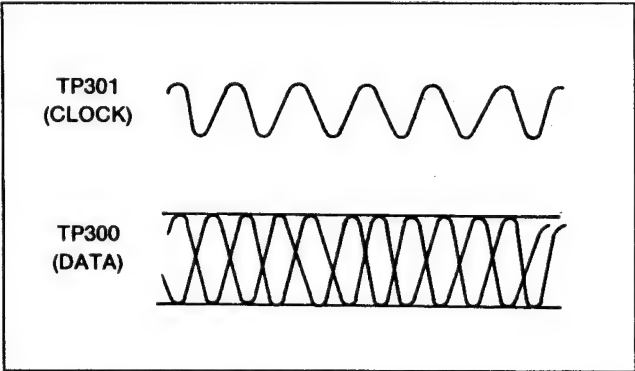
<STEP 6>

SPEC	TP301 CLOCK IS LOCKED WITH TP300
TEST	TP301 [B2], TP300 [B2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	400MHz OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	CONFIRMATION ONLY

5000 SERIES

- Set the STBY OFF status to "EE2" mode.
VIDEO OUT SET UP
- SCOPE CH1 : TP301/TPG300
CH2 : TP300 --- TRIGGER
- SCOPE : 500mV/AC
SETTING : SWEEP = 10nsec/div
- Confirm that the DATA signal and CLOCK signal are frequency locked.

Note: Set the 20MHz Filter of oscilloscope to OFF mode.



5-2. ENVELOPE MAX ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

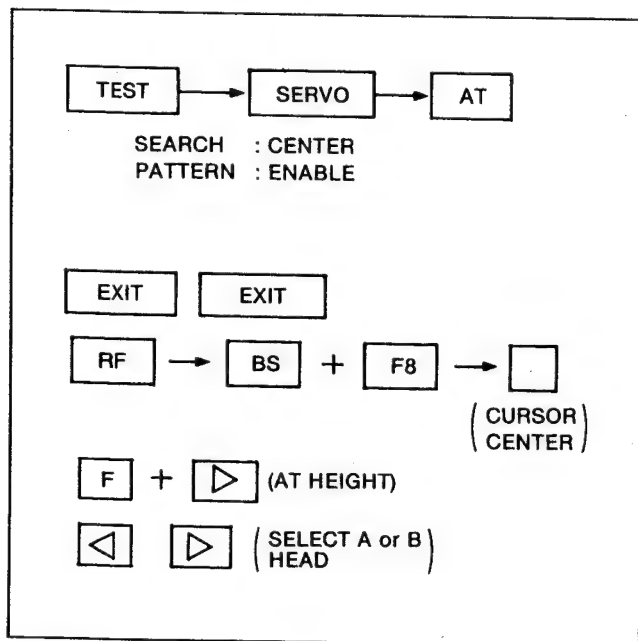
SPEC	RF ENVELOPE IS MAXIMUM
TEST	TP8[E2], P3-B22(RIGHT SIDE) of Extension Board
MODE	VAR (X1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	ADJ. KNOB (on the Front Panel), AT HEIGHT

5000 SERIES

<STEP 1>

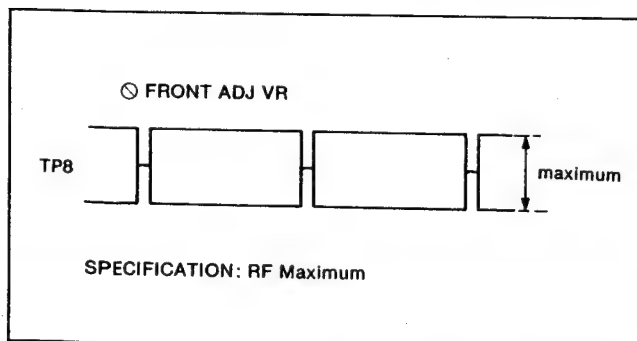
MENU CONDITION

TEST SERVO AT HEIGHT



<STEP 2>

1. Playback a shuffling off 75% Color bar Alignment Tape on VAR X1 mode.
2. Adjust the Adj. KNOB VR on the Front Panel so that the Envelope is maximum.



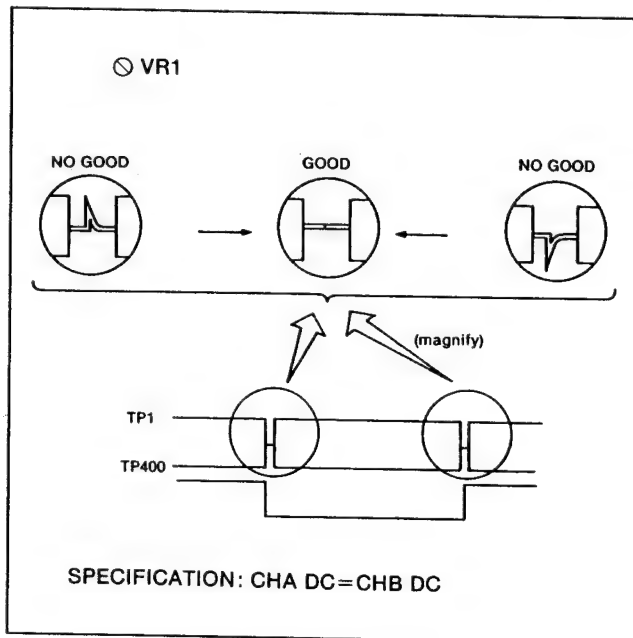
5-3. AB DC BAL ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	CHA DC = CHB DC
TEST	TP1[H3], TP400[F4]
MODE	VAR (X1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1 (A/B DC BAL)[H1]

5000 SERIES

<STEP 1>

1. SCOPE CH1 : TP1 : TPG1
CH4 : TP400
2. SCOPE CH1 : 50mV/DC 50Ω
CH4 : 5V/DC
3. SCOPE MODE : CH0P
4. SCOPE TRIG : CH4
5. SCOPE SWEEP : A = 2ms/div
B = 50μS/div
6. Adjust VR1 so that the Envelope is as shown in Figure.



5-4. ENVELOPE DETECTION ADJUSTMENT

(S1 : REC/PLAY CH0)

(S2 : REC/PLAY CH1)

SPEC	ENVELOPE MINIMUM DC LEVEL = $0V \pm 0.2VDC$ ENVELOPE MAX. = $2Vp-p \pm 0.2V$
TEST	TP502 [H4], TP400 [F4], TP8 [E2]
MODE	STILL
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2(A/B GAIN BAL)[H1], VR500(ENV GAIN)[I4], VR501 (ENV OFFSET) [I4]

5000 SERIES

<STEP 1>

MENU CONDITION

TEST SERVO AT

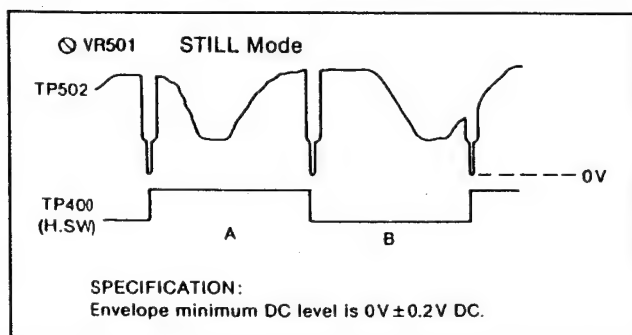
Set the [PATTERN] to "FIX".

SEARCH - CENTER

PATTERN - FIX

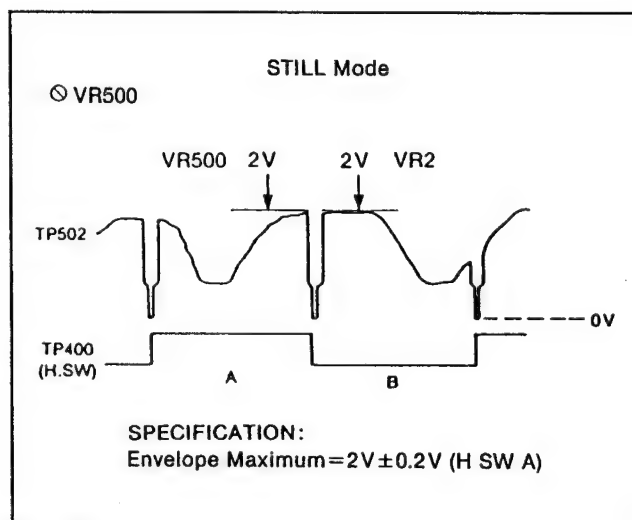
<STEP 2>

- SCOPE CH1 : TP502
SCOPE CH2 : TP400
- SCOPE SETTING : 1V/DC
SCOPE CH2 : 5V
- SCOPE MODE : CH0P
BW
- SCOPE TRIG : CH2
- SCOPE SWEEP : 2ms
- Place the unit in the STILL mode.
- Adjust VR501 so that the minimum signal level is $0V \pm 0.2V$ as shown in Figure.

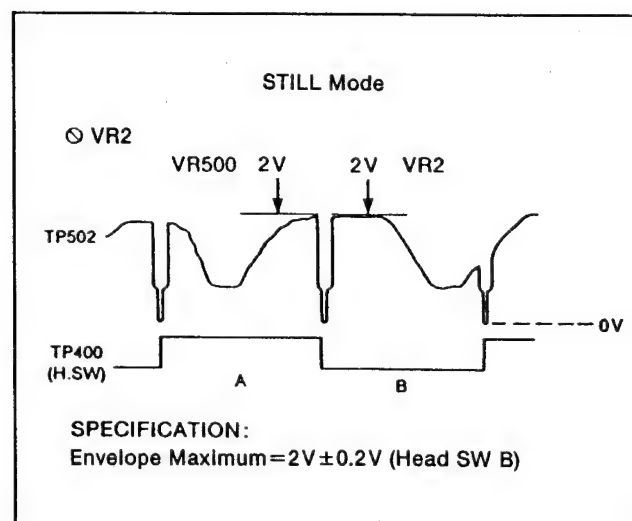


<STEP 3>

- SCOPE CH1 : TP502
SCOPE CH2 : TP400
- Rotate capstan shaft by hand (CCW) and set the Envelope becomes maximum during Head Switch A portion.
- Adjust VR500 (ENV GAIN) so that the maximum envelope level is $2V \pm 0.2V$.



- Rotate capstan shaft by hand (CCW) and set the Envelope becomes maximum during Head switch B portion.
- Adjust VR2 (A/B GAIN BAL) so that the maximum envelope is $2V \pm 0.2V$.
- After adjustment set the AT HEIGHT is 0.
- After this adjustment, item 8-1 ENVELOPE DETECTION ADJUSTMENT is required.



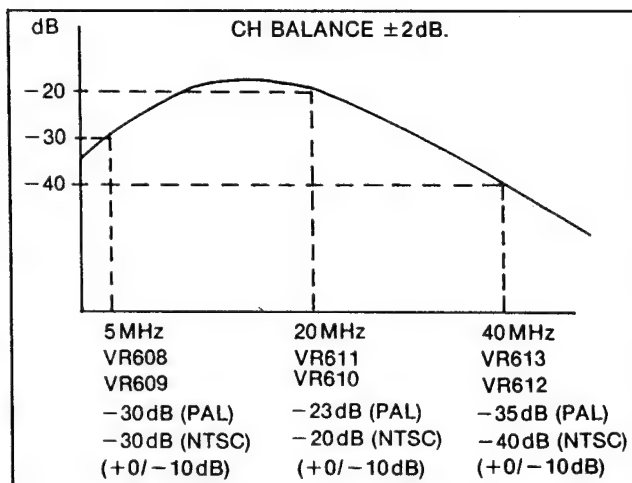
5-5. EQUALIZATION ADJUSTMENT (1)

(S1 : REC/PLAY CH0)
(S2 : REC/PLAY CH1)

Factory Preset only, skip this item after Head Replacement.

SPEC	
TEST	TP8[E2], VIDEO OUT, TP400[F4]
MODE	VAR (× 1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	See Below

5000 SERIES



<STEP 1>

Adjustment VR.

- (1) VR3 (PHASE SHIFT) -----6 division
- (2) VR609 (MAG A) -----7 division
VR608 (MAG B) -----7 division
- (3) VR613 (AFC HA) -----5 division
VR612 (AFC HB) -----5 division
- (4) VR611 (AFC MA) -----2 division
VR610 (AFC MB) -----2 division

<STEP 2>

1. Set the spectrum analyzer to REG 4 mode.
REG 4 mode

ITEM PARAMETER

- (1) REF LEVEL-10.0dBm
- (2) ATTEN 10dB
- (3) DIV (dB/DIV) 5dB/div
- (4) START FREQUENCY 0MHz
- (5) STOP FREQUENCY 50MHz
- (6) RES BW 1MHz
- (7) VIDEO BW 3kHz
- (8) SWEEP TIME 300msec
- (9) TRIGGER EXT (HEAD SW)
- (10) VID AVG 10

<STEP 3>

EQUALIZER COARSE ADJUSTMENT

1. Connect the spectrum analyzer to TP8.
2. Connect the EXT Trigger input of the spectrum analyzer to TP400 (HEAD SW).
3. Adjust VR609 (MAG A) and VR608 (MAG B) so that the gain is -30dB +0/-10dB at 5MHz portion.
4. Adjust VR613 (AFC HA) and VR612 (AFC HB) so that the gain is -35dB +0/-10dB at 40MHz portion.
5. Adjust VR611 (AFC MA) and VR610 (AFC MB) so that the gain is -23dB +0/-10dB at 20MHz portion.

Note: If still out of specification.
Just adjust as A curve as shown in Figure.
And then carry on next the adjustment.

5-6. EQUALIZATION ADJUSTMENT (2)

(S1 : REC/PLAY CH0)
(S2 : REC/PLAY CH1)

SPEC	MINIMUM ERROR RATE
TEST	TV MONITOR, FRONT ERROR DISPLAY
MODE	VAR (× 1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	VR611 (AFC MA)[F1], VR610 (AFC MB)[F1], VR613 (AFC HA)[E1], VR612 (AFC HB)[E1], VR10 (COMP BIAS LEVEL)[F1], VC301 (PHASE ADJ)[A2], VC1 (RESON A)[G2], VC2 (RESON B)[G2], VR3 (PHASE SHIFT)[I2] VR608(MAG B), VR609(MAG A)[D1], VR11 (AUTO EQ IN LEVEL)[E1] VR12 (AFC MATCH)[F4]

5000 SERIES

[RF SECTION]

<STEP 1>

1. Use the "75% Color Bars Shuffle OFF" tape.
2. Search = "CENTER"
Maximize the envelope bar graphs on the front panel by adjusting the AT heights in the SUPER USER Menu.
3. Choose "PB mode : ch0" on the SUPER USER MENU when adjusting the Equalizer CH0 board, and "PB mode : ch1" for the CH1 board at the same time video output picture must be stable.
4. Center VC1/VC2.
5. Use VR3/VR10/VC301 to minimize errors (speckling) on the picture monitor. Continue adjusting these three pots until no further improvement is possible.
6. Use VC1, VC2 & VR3 to further reduce the errors.
7. Use VC1, VC2 & VR10 in the same manner.
8. Adjust VC301 to minimize screen errors and adjust VR12 to minimize screen errors.
9. Change the ECC Sample on the TEST/RF Menu to fast.
10. Memorize the spectrum waveform on TP8 into the "B" memory of the HP8591A Spectrum Analyzer.
11. Next adjust VR613 & 611 to reduce the error rate further. Turn VR613 very slightly in the direction which reduces the INNER ERROR RATE in the "CH0 A" bar graph. Then adjust VR611 very slightly in the opposite direction CCW to reduce the error further. Continue this alternate adjustment of the pots until no more improvement is possible.
12. Repeat this same adjustment technique starting with VR612 and following with VR610, in order to minimize the INNER ERROR RATE on the "CH0 B" bar graph.
13. Recall the previously memorized waveform in the Spectrum Analyzer "B" memory, and compare it to the waveform now present on TP8. If the two waveforms aren't similar in appearance, adjust the two pairs of pots 613/611 (CHA) & 612/610 (CHB) in the manner described above, for minimum error rate for both heads, and similar spectrum waveshapes.
14. Adjust VR608 & 609 to minimize the "sawtooth" appearance of the spectrum waveform at the 5Mhz end.
15. Adjust VR10 & VC301 to further reduce the Inner Error Rate.

VR613, 611, 612, 610


 ⊙ VR613, VR611 (CHA)
 ⊙ VR612, VR610 (CHB)

TP8

Memorize data

Output data

Almost Same

 ⊙ VR608
 ⊙ VR609

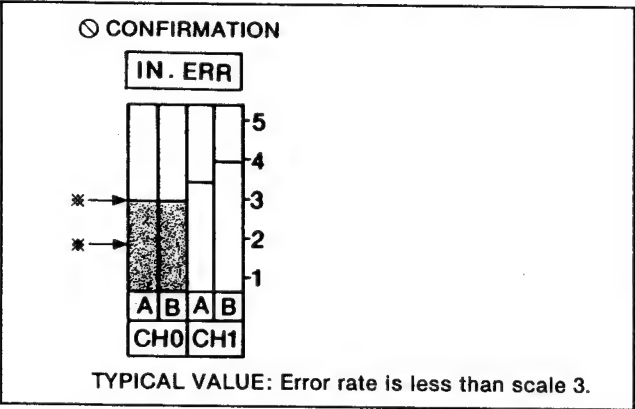
TP8

Minimum

5 MHz Portion

VR608, VR609

16. Confirm the error rate is less than 10-4 (scale 3).



Note: After equalization adjustment, RF envelope output level adjustment is required as follows.

1. Connect the scope to TP8 and place the unit in PLAY mode.
2. Adjust VR608 and VR609 so that the output envelope is 400mVp-p. (50Ω terminated).
3. Connect the scope to WFM out and adjust VR11 so that the output envelope is 200mVp-p (75Ω terminated).

5-7. WFM OUT CONFIRMATION (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	EYE : 200mV ± 50mV
TEST	WFM OUT
MODE	VAR X1
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR11 (AUTO EQ IN LEVEL)[E1],

5000 SERIES

<STEP 1>

1. Connect the scope to VFM OUT on the rear panel through 75Ω termination.
2. Set the Front Menu to WFM ENV mode.
3. Confirm the ENVELOPE level is 900mV ± 200mV.
4. Set the Front Menu to WFM EYE mode.
5. Adjust VR11 (AUTO EQ IN LEVEL) so that the level is 200mV ± 50mV.

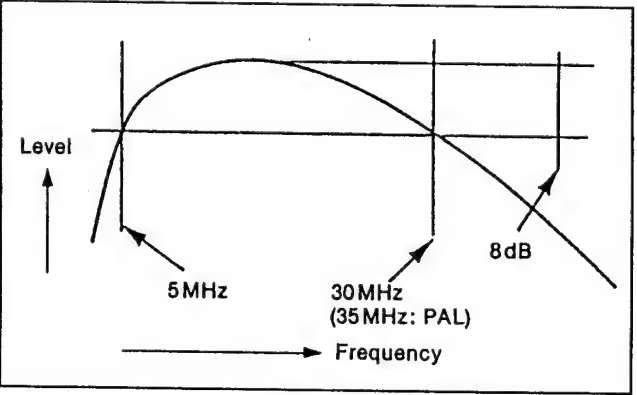
FINAL CONFIRMATION

SPEC	Refer to figure
TEST	TP8 [E2], TP400 [f4]
MODE	VAR × 1
TAPE	SHUFFLING OFF 75% COLOR BAR
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	VR3,VR610,VR611,VR612,VR613,VC1,VC2

1. Set the spectrum analyzer as shown in item 5-5.
2. Connect the spectrum analyzer to TP8.
3. Connect the EXT input of spectrum analyzer to TP400.
4. Confirm that the output spectrum is as shown in figure.
5. If it is not, readjust VR3, VC1, VC2 (PHASE), VR610, VR612, VR611 and VR613 (LEVEL).

$$5\text{MHz} = 30\text{MHz} \pm 2\text{MHz (NTSC)}$$

$$35\text{MHz} \pm 2\text{MHz (PAL)}$$



7. CUE AUDIO (S3) BOARD MODE CONDITION

Set the Switches on the AUDIO IN. OUT P.C.B. and set the MENU condition.

INPUT ATT SELECT SW 0dBm

(on the AUDIO IN/OUT Board)

OUTPUT ATT SELECT SW 0dBm

(on the AUDIO IN/OUT Board)

INPUT IMPEDANCE SW HIGH

(on the AUDIO IN/OUT Board)

MENU CONDITION

AUDIO IN MENU

Select the CUE AUDIO LEVEL to "UNITY" : F5

AUDIO OUT MENU

Select the CUE AUDIO LEVEL to "UNITY" : F5

7-1. MASTER OSC DRIVE VOLTAGE ADJUSTMENT (S3 : CUE AUDIO)

SPEC	21V \pm 0.1V DC
TEST	TP1[I5]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1 (21V ADJ.)[I4]

<STEP 1>

- SCOPE : TP1
- Place the unit in the RECPLAY mode.
- Adjust VR1 so that the DC voltage is 21V \pm 0.1V DC.

7-2. MASTER OSC ADJUSTMENT (S3 : CUE AUDIO)

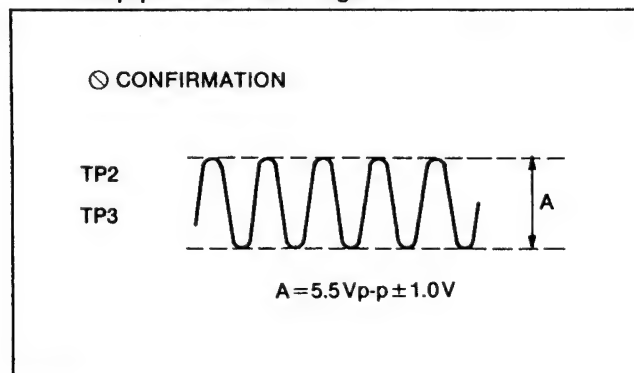
SPEC	TP2 = 70kHz \pm 0.2kHz, 5.5Vpp \pm 1.0V TP3 = 5.5Vpp \pm 1.0V
TEST	TP2[H2], TP3[G2]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	FREQUENCY COUNTER, OSCILLOSCOPE
INPUT	
ADJ.	T1[H2], T1 on S3 SUB2

<STEP 1>

- FREQUENCY COUNTER : TP2
- Place the unit in the RECPLAY mode.
- Adjust T1 so that the OSC frequency is 70kHz \pm 0.2kHz.

<STEP 2>

- SCOPE CH1 : TP2
CH2 : TP3
- Place the unit in the RECPLAY mode.
- Confirm that the OSC frequency level A is 5.5 \pm 1.0Vp-p as shown in Figure.



<STEP 3>

- Scope CH1 : PIN 6 of S3 SUB2
- Adjust T1 on S3 SUB2 so that the OSC level becomes maximum.

<STEP 4>

- SCOPE CH1 : PIN 6 of S3 SUB2
CH2 : PIN 7 of S3 SUB2
- Confirm the OSC level is 5.5Vpp \pm 1V.
- Confirm the frequency is 140 kHz \pm 5kHz.

7-3. FULL ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

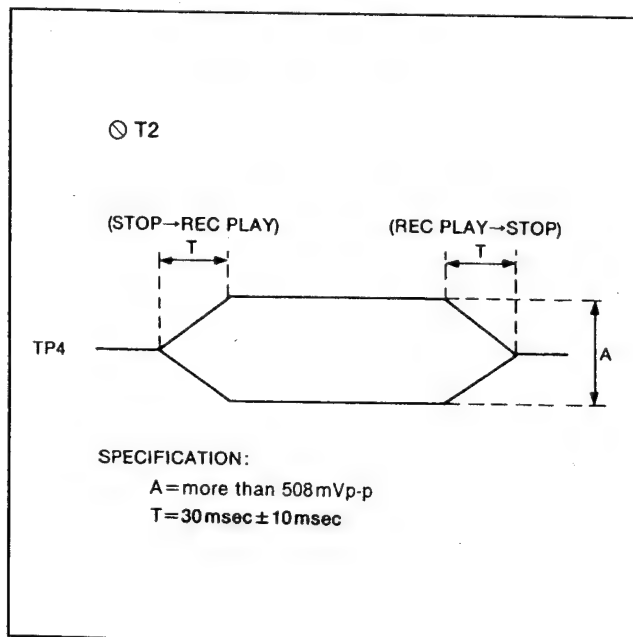
SPEC	TP4 : more than 508mVp-p, T = 30msec \pm 10msec
TEST	TP4[H1]
MODE	RECPLAY, RECPLAY \leftrightarrow STOP
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE (STORAGE)
INPUT	
ADJ.	T2[I1]

<STEP 1>

1. SCOPE : TP4
2. Place the unit in RECPLAY mode.
3. Adjust T2 so that the signal level A is maximum.
4. Confirm that level A is more than 508mVp-p.

<STEP 2>

1. Place the unit moving to RECPLAY from STOP mode and moving to STOP from RECPLAY mode.
2. Confirm that the rising and falling period of the waveform is 30ms \pm 10ms as shown in Figure.



7-4. CUE ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

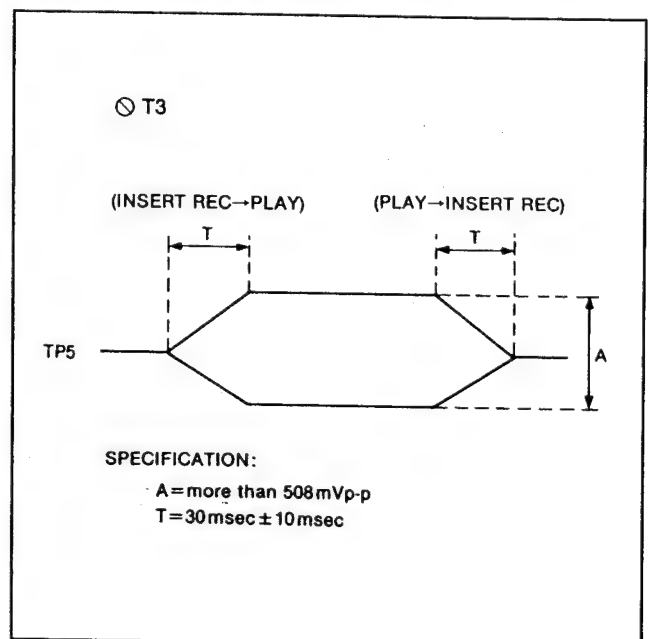
SPEC	TP5 : more than 508mVpp, T = 30msec \pm 10msec
TEST	TP5[G2]
MODE	INSERT REC \leftrightarrow PLAY (CUE ON)
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T3[G1]

<STEP 1>

1. SCOPE : TP5
2. Place the unit in INSERT CUE REC mode.
3. Adjust T3 so that the signal level A is maximum.
4. Confirm that it level A is more than 508mVp-p as shown in Figure.

<STEP 2>

1. Place the unit moving to INSERT REC from play and moving to play from INSERT REC mode.
2. Confirm that the rising and falling period of the waveform is 30ms \pm 10ms as shown in Figure.



7-5. T/C ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP6 : more than 508mVpp, T = 30msec \pm 10msec
TEST	TP6 (T/C ERASE)[F2]
MODE	INSERT REC. ASSEMBLE REC ASSEMBLE REC \leftrightarrow PLAY
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T4 (T/C ERASE)[F1]

<STEP 1>

MENU CONDITION

MAN - EDIT MENU INSERT "ON"

Select the TC F10 to "ON".

<STEP 2>

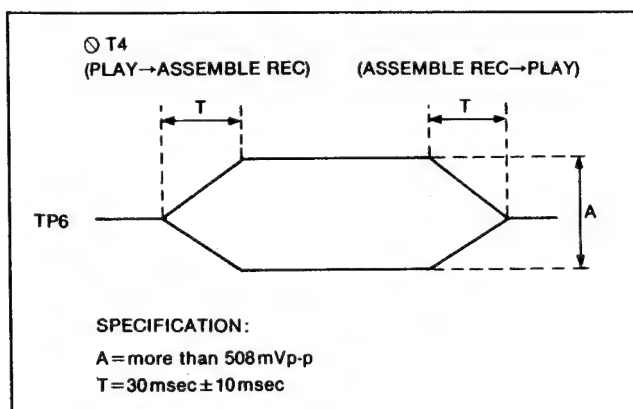
1. SCOPE : TP6
2. Place the unit in INSERT REC mode.
3. Adjust T4 so that the signal level A is maximum.
4. Confirm that it level A is more than 508mVp-p as shown in Figure.

<STEP 3>

1. Place the unit in ASSEMBLE RECORDING mode.
2. Confirm that the signal level A is more than 508mVp-p.
3. If it is not, Adjust T4 so that the level A is more than 508mVp-p as shown in Figure.

<STEP 4>

1. Place the unit moving in ASSEMBLE RECORDING mode from PLAYBACK mode and moving in PLAYBACK from ASSEMBLE RECORDING mode.
2. Confirm that the rising and falling period of the waveform is 30msec \pm 10msec as shown in Figure.



7-6. CTL ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP7 : more than 508mVpp, T = 30msec \pm 10msec
TEST	TP7[D2]
MODE	ASSEMBLE REC to PLAY, PLAY to ASSEMBLE REC
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T5[D1]

<STEP 1>

MENU CONDITION

MAN - EDIT MENU ASSEMBLE

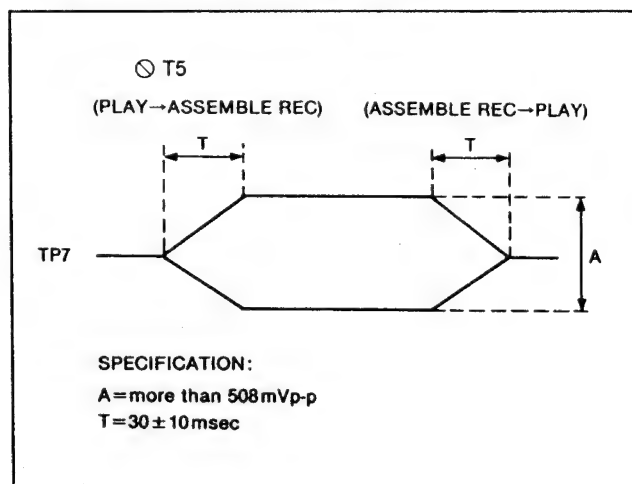
Select the TC F10 to "OFF". (CTL)

<STEP 2>

1. SCOPE : TP7
2. Place the unit in ASSEMBLE REC mode.
3. Adjust T5 so that the signal level A is maximum.
4. Confirm that level A is more than 508mVp-p as shown in Figure.

<STEP 3>

1. Place the unit in ASSEMBLE RECORDING mode from PLAYBACK mode and moving in PLAYBACK from ASSEMBLE RECORDING mode.
2. Confirm that the rising and falling period of the waveform is 30 \pm 10msec as shown in Figure.



7-7. T/C BIAS & SIGNAL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP8 BIAS CURRENT A = $62\text{mVpp} \pm 3\text{mV}$ SIGNAL CURRENT B = $5\text{mVpp} \pm 0.2\text{mV}$
TEST	TP8[I3], TP10[H4], TP11[I4]
MODE	ASSEMBLE REC
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE, PROBE 1:1
INPUT	
ADJ.	T6[I2], VR2 (T/C BIAS CURRENT)[I3] VR4 (T/C SIGNAL CURRENT)[G4]

<STEP 1>

MENU CONDITION

MAN - EDIT MENU ASSEMBLE

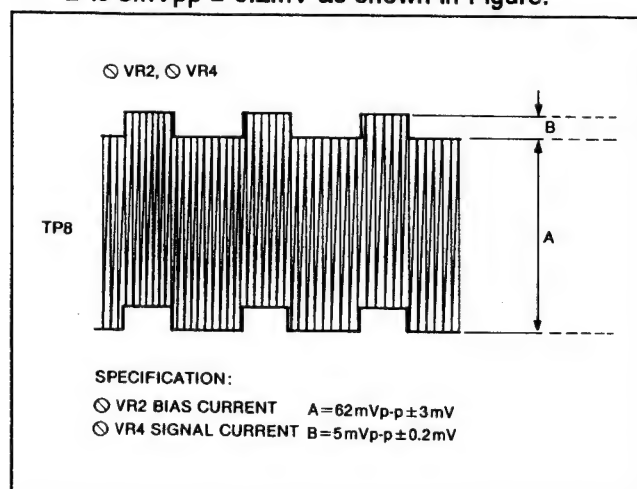
Select the TC F10 to "ON".

<STEP 2>

1. SCOPE : TP8
2. Place the unit in ASSEMBLE REC mode.
3. Adjust T6 so that the signal level A is maximum.

<STEP 3>

1. SCOPE : TP10, TP11 (probe GND)
2. Place the unit in ASSEMBLE REC mode.
3. Adjust VR2 so that the BIAS CURRENT LEVEL A is $62\text{mVpp} \pm 3\text{mV}$ as shown in Figure.
4. Adjust VR4 so that the SIGNAL CURRENT LEVEL B is $5\text{mVpp} \pm 0.2\text{mV}$ as shown in Figure.



7-8. CUE BIAS CURRENT ADJUSTMENT (1)(S3 : CUE AUDIO)

SPEC	TP9 : MAXIMUM, CUE OUT : MAXIMUM
TEST	TP9[F3], CUE OUT
MODE	REC PLAY, REC PLAY ↔ PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	1kHz 0dBm Sinewave signal to CUE IN
ADJ.	T7[F3], VR3 (CUE BIAS CURR.)[G3]

<STEP 1>

1. SCOPE : TP9
2. Place the unit in REC PLAY mode.
3. Adjust T7 so that the signal level is maximum.

T7 Signal Level = maximum

<STEP 2>

1. SCOPE : CUE OUT
2. Place the unit repeat moving in REC PLAY from PLAYBACK and in PLAYBACK from REC PLAY mode.
3. Adjust VR3 so that the signal level is maximum.

7-9. EE LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP13 : -12dBm \pm 0.2dB, CUE OUT : 0dBu \pm 0.2dB
TEST	TP13[B3], CUE OUT
MODE	
TAPE	VTVM
M.EQ	1kHz 0dBu Analog Sinewave signal to CUE IN
INPUT	VR6 (EE LEVEL)[B3], VR7 (EE OUT LEVEL)[A3]
ADJ.	

4000 SERIES

<STEP 1>

MACHINE CONDITION

IN/OUT ATT SW (on AUDIO IN/OUT P.C.B) : 0dBm

INPUT IMPEDANCE : HIGH

AUDIO IN MENU : UNITY

<STEP 2>

VTVM : TP13

Adjustment VR : VR6

SPECIFICATION : -12dBm \pm 0.2dB

<STEP 3>

VTVM : CUE OUT

Adjustment : VR7

SPECIFICATION : 0dBu \pm 0.2dB

7-10. PLAYBACK EQUALIZER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	50Hz ~ 1kHz = -3dB ~ +1.5dB
TEST	TP16 [C3]
MODE	PLAY
TAPE	AUDIO FREQUENCY RESPONSE
M.EQ	VTVM
INPUT	
ADJ.	VR10 (PB EQ)[C1]

<STEP 1>

1. VTVM : TP16
2. Play back the Alignment Tape.
3. Adjust VR10 so that the Playback level is within the specification as shown.

SPECIFICATION:

50Hz ~ 1kHz = -3dB ~ +1.5dB

1kHz ~ 15kHz = \pm 1.0dB

(1kHz 0dB Reference)

7-11. PLAYBACK LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP16 = -12dB \pm 0.2dB, CUE OUT : 0dBu \pm 0.2dB
TEST	TP16[C3], CUE OUT
MODE	PLAY
TAPE	AUDIO LEVEL ALIGNMENT TAPE
M.EQ	VTVM
INPUT	
ADJ.	VR11 (PB LEVEL)[B2], VR12 (PB OUT LEVEL)[C3]

<MACHINE CONDITION>

1. Output ATT : 0dB
2. Audio out Cue : UNITY (MENU)

<STEP 1>

1. VTVM : TP16
2. Playback the Audio Level Alignment Tape.
3. Adjustment VR : VR11

SPECIFICATION : -12dBm \pm 0.2dB

<STEP 2>

1. VTVM : CUE OUT
2. Playback the Audio Level Alignment Tape.
3. Adjustment VR : VR12

SPECIFICATION : 0dBu \pm 0.2dB

7-12. CUE BIAS CURRENT ADJUSTMENT (2) (S3 : CUE AUDIO)

SPEC	TP16 : -12dBm \pm 0.2dB CUE OUT AUDIO DISTORTION IS LESS THAN 3%
TEST	TP16[C3], CUE OUT
MODE	REC PLAY \leftrightarrow PLAY
TAPE	BLANK TAPE
M.EQ	VTVM DISTORTION METER
INPUT	1kHz 0dBm, 1kHz +12dBm
ADJ.	VR8[A2]

<STEP 1>

1. VTVM : TP16
2. Supply a 1kHz 0dBm sine wave signal to CUE IN and Record.
3. Playback a just recorded portion.
4. Adjust VR8 so that the CUE BIAS CURRENT LEVEL is -12dBm \pm 0.2dB.

TP16

SPECIFICATION : VR8 : -12dBm \pm 0.2dB

<STEP 2>

1. DISTORTION METER : CUE OUT
2. Supply a 1kHz +12dBm sinewave signal to CUE IN and Recorded.
3. Playback a just recorded portion.
4. Confirm that the distortion is less than 3%.
5. If it is not adjust VR3 as follow as item 7-11. CUE BIAS CURRENT ADJUSTMENT (1) <STEP 2>.

CUE OUT

SPECIFICATION:

AUDIO DISTORTION : less than 3%

7-13. REC EQUALIZER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	50Hz ~ 1kHz = -3dB ~ +1.5dB 1kHz ~ 15kHz = 1.0dB (1kHz 0dB Reference)
TEST	CUE OUT
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	VTVM
INPUT	-10dBm 1kHz, SWEEP
ADJ.	VR14 (REC EQ 2)[B2], FL4[A2], VR9[A2]

<STEP 1>

1. VTVM : CUE OUT
2. Supply a difference frequency sinewave as shown below and record.
3. Playback a just recorded portion.
4. Adjust VR14, FL4 and VR9 so that the Playback level is within the specification.

INPUT LEVEL: -10dBm 1kHz (Reference)
-10dBm SWEEP as shown below

SPECIFICATION:

50Hz ~ 1kHz = -3dB ~ +1.5dB
1kHz ~ 15kHz = ± 1.0dB
(1kHz -10dBm Reference)

Adjustable frequency

VR14 and FL4 : 5kHz ~ 12.5kHz
VR9 : 12.5kHz ~ 15kHz

7-14. RECORDING LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP16 : -12dBm ± 0.2dB
TEST	TP16[C3]
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	VTVM
INPUT	1kHz 0dBm Sinewave Signal to CUE IN
ADJ.	VR8[A2]

<STEP 1>

1. VTVM : TP16
2. Supply a 1kHz 0dBu sinewave signal to CUE IN and Record it.
3. Playback a just recorded portion.
4. Adjust VR8 so that the level is -12dBm ± 0.2dB.

SPECIFICATION : -12dBm ± 0.2dB

7-15. CUE METER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	CUE METER -20dB
TEST	CUE METER
MODE	EJECT
TAPE	
M.EQ	
INPUT	1kHz 0dBm Signal to CUE IN
ADJ.	VR13[C4]

<STEP 1>

Note: Before this adjustment, CUE METER OFFSET (item 12-3) is required.

1. Supply a 1kHz 0dBu sinewave signal to CUE IN.
2. Adjust VR13 so that the meter level is -20dB.

7-16. CUE MIX ADJUSTMENT (S3 : CUE AUDIO)

SPEC	0dBm \pm 0.5dBm
TEST	CUE OUT
MODE	EJECT
TAPE	
M.EQ	
INPUT	1kHz 0dBm Sinewave Signal to CUE IN
ADJ.	VR5[B4]

<STEP 1>

1. Supply a 1kHz 0dBu sinewave signal to CUE IN.
2. Set the VTR in to the CUE DMIX mode as shown below.

AUDIO IN → SET UP → CH MIX ON →
(CURSOR CENTER) → set the CH-1 S

3. Adjust VR5 so that the cue output level is 0dBm \pm 0.5dBm.

8. AT (S4) BOARD MACHINE CONDITION

MACHINE CONDITION

1. Disconnect the P523 on the H.A. REGULATOR (S) P.C.B. which is located at right side of the Mechanism. while adjustment 8-1 through 8-6.
Connect P523 from adjustment 8-7.

MENU CONDITION

TEST MENU

AT SERVO TEST MENU

Set the each functions as follow.

1. F4: SEARCH = "CENTER"
2. F5: PATTERN = "ENABLE"
3. F8: AT HEIGHT = Ach "0"
Bch "0"
4. SW2601 [D2] on S4 board is OPEN.
5. Error correction switches on L3 board are all OFF.
6. Error concealment switch on L4 board is OFF.

8-1. ENVELOPE DETECTION ADJUSTMENT (S4 : AT)

SPEC	0.7V \pm 0.1VDC, PEAK = +3V \pm 0.1VDC
TEST	TP2611 (ENV CH1)[D1], TP2612 (ENV CH0)[D1]
MODE	STOP, EJECT, SW2601=OPEN, P523=OFF SEARCH = CENTER, PATTERN = ENEBLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2601[F2], VR2603[D4], VR2602[F2], VR2604[E4]

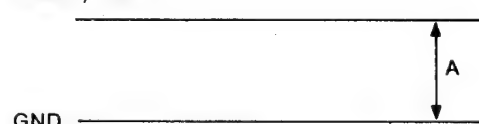
<STEP 3>

1. SCOPE : CH1 TP2611
SCOPE : CH2 TP2612
2. Set the VTR in STOP mode.
3. Rotate the capstan shaft by hand, and set the waveform peak becomes maximum.
4. Adjust VR2603 and VR2604 so that the level of waveform is 3V \pm 0.1V DC.
5. Note that VR2601/VR2602/VR2603/VR2604 effect each other.
Repeat step 2 and 3 and confirm that each adjustment is in specification.

⊙ VR2601, ⊙ VR2602

EJECT mode

TP2611, TP2612



SPECIFICATION: A = 0.7V \pm 0.1V DC

⊙ VR2603, ⊙ VR2604

STOP mode

TP2611
(CH0)
TP2612
(CH1)



SPECIFICATION: PEAK = +3V \pm 0.1V DC

<STEP 1>

MENU CONDITION

Refer to the Machine Condition and Menu Condition at the beginning of this SECTION. P523 = OFF

<STEP 2>

1. SCOPE : CH1 TP2611
SCOPE : CH2 TP2612
2. Set the VTR in EJECT mode.
3. Adjust VR2601 and VR2602 so that the level of waveform is 0.7V \pm 0.1 V DC.

8-2. CONFIRMATION OF GROUP DELAY COMPENSATION CIRCUIT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2621[H3]
MODE	VAR (X-1, STILL, X1, X2, X3), SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>

MACHINE CONDITION

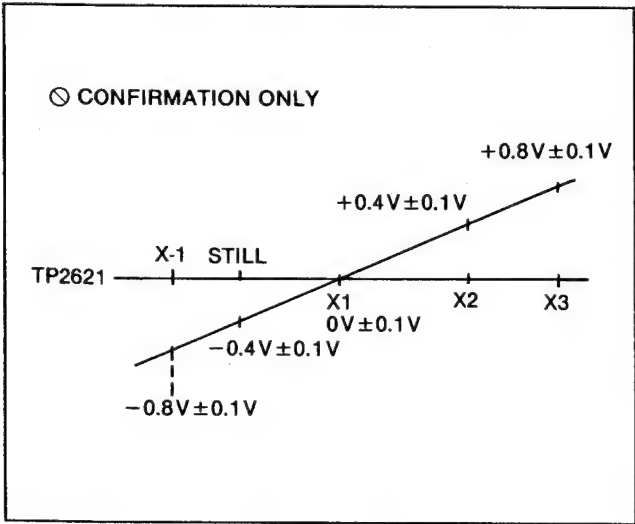
Refer to the Machine condition and Menu condition at the beginning of this section.

<STEP 2>

Connect the scope to TP2621

<STEP 3>

Set the VTR VAR X-1, STILL, X1, X2 and X3 and confirm the each DC voltage is shown below.



<STEP 4>

The DC level of VAR X3 mode should be stable more than 20 sec.

8-3. D/A CONVERTER FULL SCALE ADJUSTMENT (S4 : AT)

SPEC	5.0V ± 0.1VDC
TEST	TP2606 [B1], TP2607 [B2]
MODE	EJECT SW2601-OPEN, P523-OFF, SEARCH-CENTER, PATTERN-FIX
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2613 (DA1FS)[B2], VR2614 (DA2FS)[B2]

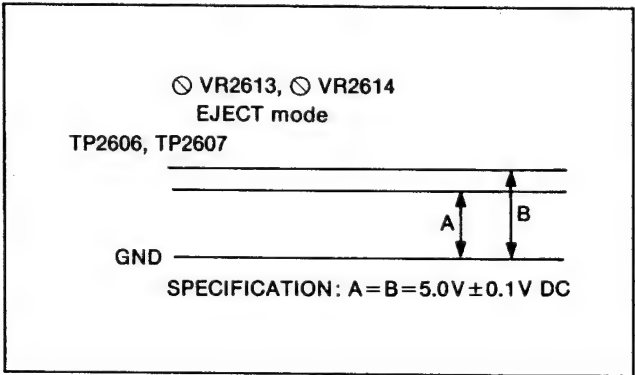
<STEP 1>

MACHINE CONDITION

1. Set the VTR in EJECT mode.
2. Set the AT mode to SEARCH = CENTER and PATTERN = FIX in the AT TEST Menu.

<STEP 2>

1. SCOPE CH1 : TP2606
SCOPE CH2 : TP2607
2. Adjust VR2613 and VR2614 so that the voltage at TP2606 and TP2607 are +5V ± 0.1V DC.
3. Adjust VR2613 and VR2614 so that the difference voltage between TP2606 and TP2607 are within 0.05V. If the both voltage at TP2606 and TP2607 are 5.0V DC, then it is OK. If the one of the voltage is 4.9V adjust the other level is same level.
4. Note that the VR2613 and VR2614 effect each other.



8-4. D/A CONVERTER OFFSET ADJUSTMENT (S4 : AT)

SPEC	TP2606 = TP2607 = $0V \pm 0.05V$ DC
TEST	TP2606[B1], TP2607[B2], TP2623[D1], TP2624[E1], TP2619[E1] ... TRIGGER
MODE	VAR X1, SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = FIX
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2615 (DA10S)[B2], VR2616 (DA20S)[B2]

<STEP 1>

MACHINE CONDITION

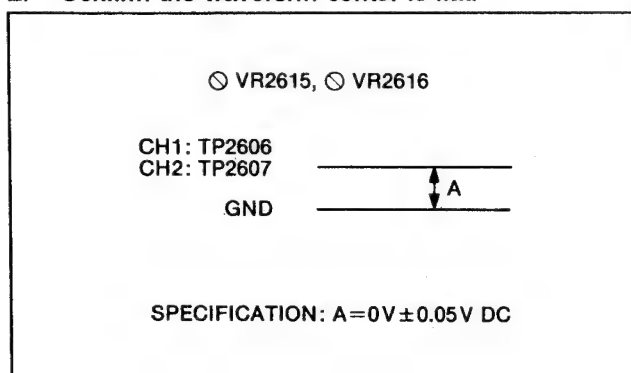
1. Set the AT mode to SEARCH = CENTER and PATTERN = FIX in the AT TEST Menu.
2. Set the VTR in VAR X1 mode.

<STEP 2>

1. SCOPE CH1 : TP2606
CH2 : TP2607
2. Adjust VR2615 and VR2616 so that their voltage are $0V \pm 0.05V$ DC.

<STEP 3>

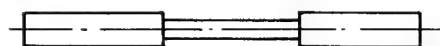
1. SCOPE CH1 : TP2623
CH2 : TP2624
2. Confirm the waveform center is flat.



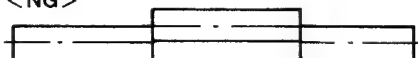
○ CONFIRMATION

TP2623
TP2624

<OK>



<NG>



8-5. OPEN GAIN ADJUSTMENT (S4 : AT)

SPEC	TP2627 = TP2628 = $4.0V_{pp} \pm 0.2V_{p-p}$
TEST	TP2627[I1], TP2628[I1]
MODE	VAR, SPEED : FRAME STILL, SW2601 = OPEN, P523 = OFF STRN = OPEN, SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2607[F1], VR2608[G1]

<STEP 1>

MACHINE CONDITION

<STEP 2>

MENU CONDITION

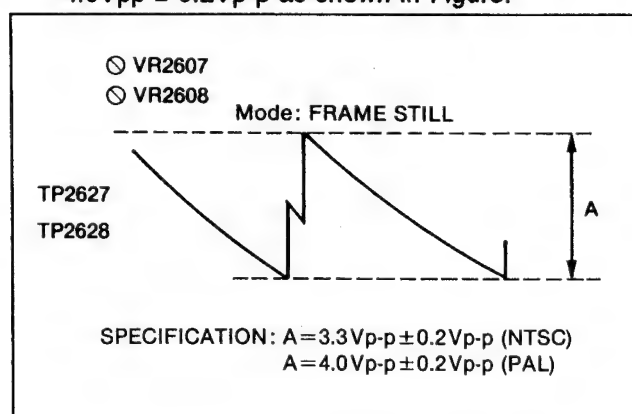
Refer to the Machine Condition and Menu Condition at the beginning of this SECTION.

<STEP 3>

1. SCOPE : TP2627
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2607 so that the waveform level A is $4.0V_{pp} \pm 0.2V_{p-p}$ as shown in Figure.

<STEP 4>

1. SCOPE : TP2628
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2608 so that the waveform level A is $4.0V_{pp} \pm 0.2V_{p-p}$ as shown in Figure.



8-6. DRIVE WAVEFORM CONFIRMATION (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP5006, TP5007 (HEAD AMP REGURATOR BOARD)
MODE	VAR X3,VAR X-1,SW2601=OPEN,P523=OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>

MACHINE CONDITION

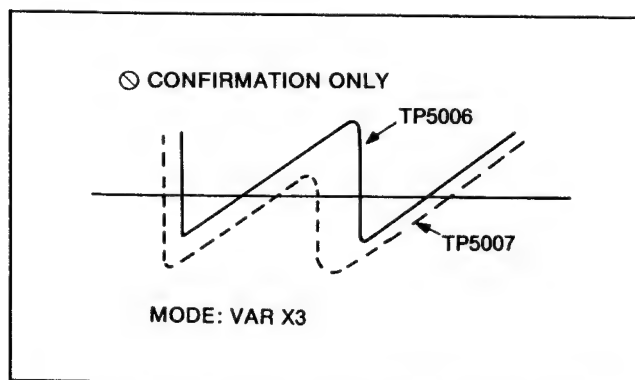
Set the Machine condition as shown in the first page of this section.

<STEP 2>

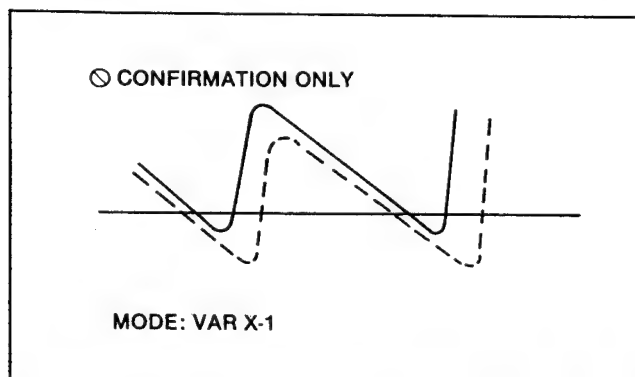
- SCOPE CH1 : TP5006
CH2 : TP5007 on H.A.REGURATOR BOARD

The H.A.REGURATOR BOARD is located at right side of mechanism.

- Set the VTR in VAR X3 mode and confirm the drive voltage is as shown below.



- Set the VTR in VAR X-1 mode and confirm the drive voltage is as shown below.



- Turns power off and connect P523.

8-7. STRAIN SENSOR OUTPUT ADJUSTMENT (A CH) (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2627[I1], TP2629[G1] TP2619[E1] ... TRIGGER
MODE	VAR FIELD STILL,SW2601=OPEN,P523=ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE (DC mode)
INPUT	
ADJ.	VR2609 (STR OS A)[G1]

<STEP 1>

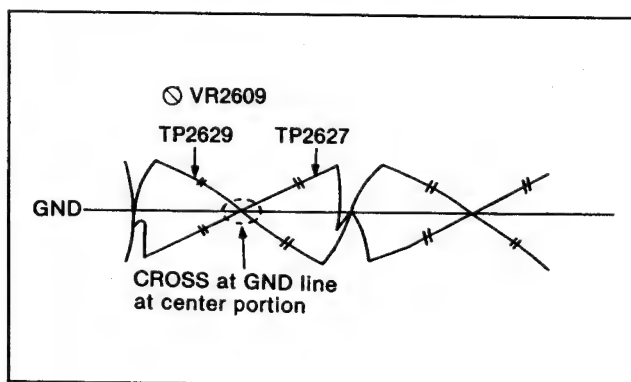
- Confirm the P523 is connected.
- Set the AT mode SEARCH = CENTER and PATTERN = ENEBLE by AT TEST Menu.

<STEP 2>

- Press VAR button and set the speed to STILL (FIELD STILL).
- SCOPE CH1 : TP2627
CH2 : TP2629
TRIGGER : TP2619

<STEP 3>

- Rotate the capstan shaft by hand and set the waveform of TP2627 crosses to GND at center of the slope.
- Adjust VR2609 so that the TP2629 and TP2627 waveform crosses to GND at their center of the waveform.



8-8. STRAIN SENSOR OUTPUT ADJUSTMENT (B CH) (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2628[H1], TP2630[H1] TP2619[E1] ... TRIGGER
MODE	VAR FIELD STILL, SW2601-OPEN, P523-ON SEARCH - CENTER, PATTERN - ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE (DC mode)
INPUT	
ADJ.	VR2610 (STR OS B)[H1]

<STEP 1>

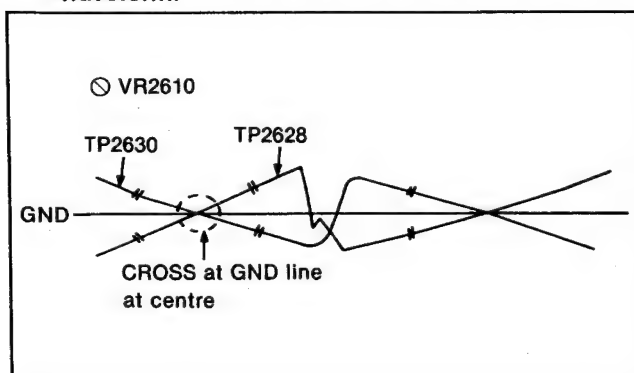
1. Confirm the P523 is connected.
2. Set the AT mode SEARCH = CENTER and PATTERN = ENEBLE by AT TEST Menu.

<STEP 2>

1. Press VAR button and set the speed to STILL (FIELD STILL).
2. SCOPE CH1 : TP2628
CH2 : TP2630
TRIGGER : TP2619

<STEP 3>

1. Rotate the capstan shaft by hand and set the waveform of TP2628 crosses to GND at center of the slope.
2. Adjust VR2610 so that the TP2630 and TP2628 waveform crosses to GND at their center of the waveform.



8-9. STRAIN SENSOR GAIN ADJUSTMENT (S4 : AT)

SPEC	TP2630 - TP2629 = 4.0Vpp ± 0.5V
TEST	TP2629[G1], TP2630[H1]
MODE	JOG, SPEED : FRAME STILL, SW2601 - OPEN, P523 - ON SEARCH - CENTER, PATTERN - ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2611[G1], VR2612[G1]

Connect P523

<STEP 1>

MENU CONDITION

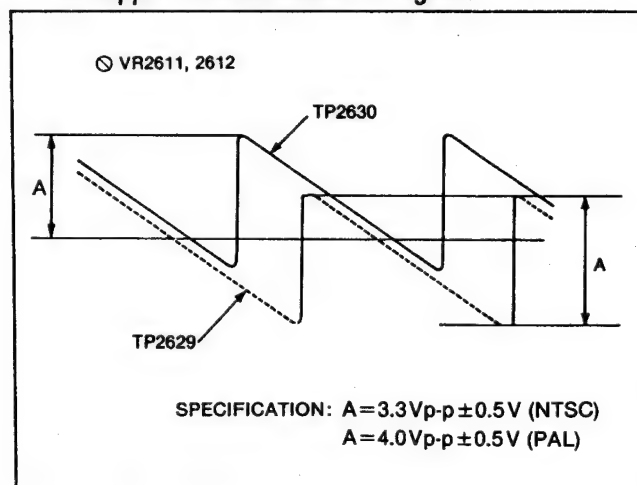
Refer to the Machine Condition and Menu Condition at the beginning of this SECTION. Do not remove P523.

<STEP 2>

1. SCOPE : TP2629
2. Playback a 75% color bar portion of the Alignment Tape in FRAME STILL mode.
3. Adjust VR2611 so that the waveform level A is 4.0Vpp ± 0.5V as shown in Figure.

<STEP 3>

1. SCOPE : TP2630
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2612 so that the waveform level A is 4.0Vpp ± 0.5V as shown in Figure.



8-10. AT HEIGHT (1) ADJUSTMENT (S4 : AT)

SPEC	TP2619 PULSE IS LOCATED AS SHOWN IN FIGURE
TEST	TP2610[F1], TP2619[F1], TP5006[C2], TP5007 (H.A REGULATOR S)[C1] TP2606, TP2607
MODE	VAR×1, SW2601-OPEN, P523-ON, SEARCH-CENTER, PATTERN-ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2605[F1], VR2606[F1]

<STEP 1>

SCOPE CH1 : TP2610 Segment Pattern
SCOPE CH2 : TP2619 Pulse
SCOPE CH3 : TP5006 Drive Voltage
SCOPE CH4 : TP5007 Drive Voltage

<STEP 2>

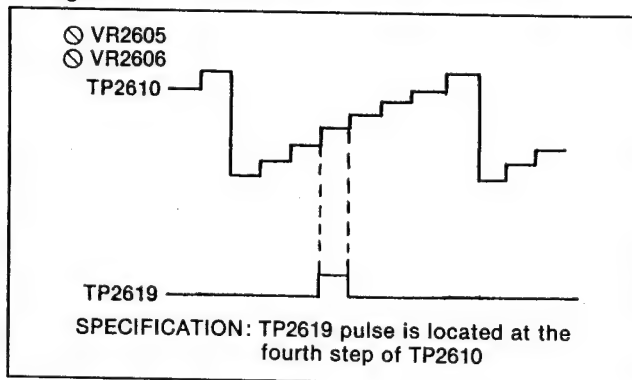
1. Field or Frame Still Option (Setup/Home/AT Play)
2. Center/Enable (Test/Servo/AT)
3. SW2601 open
4. Variable X1 Playback
5. 75% Color Bar Alignment tape, shuffling ON
6. Zero the AT Head Heights from the front panel. (Height ON/ BS with F9/left & right cursors, with the front panel knob).

<STEP 3>

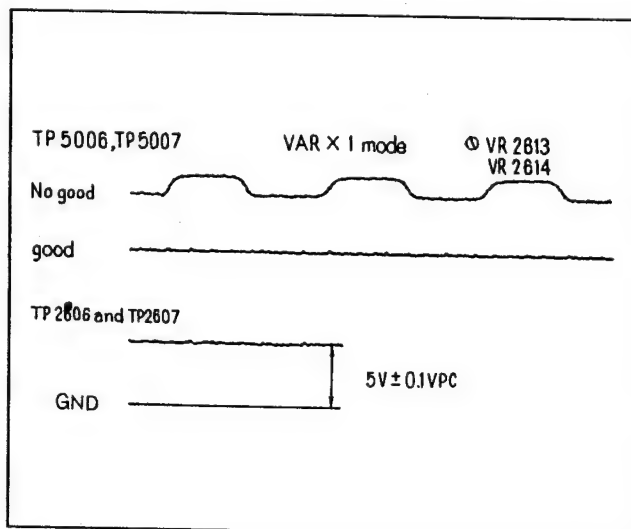
1. Initially, adjust the deflection pattern voltages at TP5006 & 5007 are 0 volts DC by VR2605 & VR2606 during VAR X1 playback. This centers the AT heads.
2. Next, fine adjust these pots to achieve three conditions
 - A). Proper rising staircase and pulse timing at TP2610 & 2619. (The stairs are rising from left to right, there are 6 or 8 steps (for NTSC or PAL), and the pulse is aligned with the highest step.
 - B). Maximum RF on the 4 "Envelope" bar graphs on the Test/Servo/AT screen.
 - C). The segment LED D609 on the AT board should be off.
3. The drive voltage at TP5006 & 5007 will have changed, but they should still be within the range of zero volts, plus or minus fifty volts.
4. Note the voltages at TP5006 & 5007 for use in subsequent adjustments.

Note:

1. In this adjustment if output drive voltage waveforms (TP5006 and TP5007) are not flat like a pulse. VR2613 and VR2614 adjustments are required as shown in Figure.



2. Place the unit in VAR × 1 mode.
3. Adjust VR2613 and VR2614 so that the output waveform are flat as shown in Figure.
4. Confirm that the voltage at TP2606 and TP2607 are $+5V \pm 0.1VDC$. (8-3. D/A CONVERTER FULL SCALE ADJUSTMENT)



8-11. AT HEIGHT (2) ADJUSTMENT (S4 : AT)

SPEC	TP2619 PULSE IS LOCATED AT PEAK OF TP2610
TEST	TP2610[F1], TP2619(TRIGGER)[E1], TP5006[C2], TP5007(H.A REGULATOR S)[C1] TP2629, TP2630
MODE	VAR, SW2601-CLOSE, P523-ON, SEARCH = CENTER, PATTERN= ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2609(STR OS A)[G1], VR2610(STR OS

This adjustment will be done in the open loop and closed loop modes.

<STEP 1>

OPEN LOOP MODE

1. 75% color bar alignment tape
2. SW2601 OPEN
3. AT menu Screen Options; CENTER/ENABLE
4. Variable X1 playback

<STEP 2>

1. SCOPE CH1 : TP2629
SCOPE CH2 : TP2630
(Strain Offset pots)
VR2609
VR2610
(Strain Offset pots)

<STEP 3>

1. Adjust VR2609 & 2610 ("STROSA" & "STROSB") for 0 volts at TP2629 & 2630.

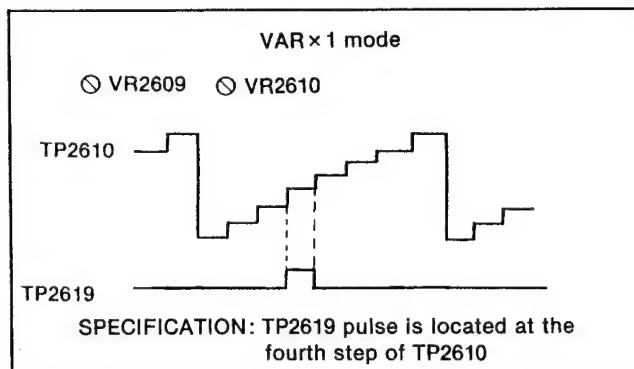
CLOSED LOOP MODE

<STEP 4>

1. Close the strain loop with SW2601.
2. Continue in Variable X1 playback.
3. While monitoring TP5006 & 5007, adjust the Strain Offsets VR2609 & 2610 for the voltages noted at in step (8-10).

<STEP 5>

1. Now, fine adjust VR2609 & 2610 for three conditions;
 - A). Proper rising staircase and pulse timing at TP2610 & 2619. (The stairs are rising from left to right, there are 6 or 8 steps (for NTSC or PAL), and the pulse is aligned with the fourth step.
 - B). Maximum RF on the 4 "envelope" bar graphs on the Test/Servo/AT screen.
 - C). Zero volts plus or minus 50 volts at test points 5006 & 5007.



<STEP 6>

Repeat section 8-10, 8-11 until front panel envelope does not change when SW2601 is opened and closed.

8-12. GAIN ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2611[D1], TP2612[D1], TP2610[F1], TP2619(TRIGGER)[E1], TP5006[C2], TP5007[C1], TP8(S1), TP8(S2), TP207 on REC Amp
MODE	VAR×1, FRAME STILL, SW2601 - CLOSE, H.A REGULATOR, P523 - ON, SEARCH - CENTER, PATTERN - ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2611[G1], VR2612[H1]

<STEP 1>

1. AT Play "Frame" option on the SET UP/HOME screen or TEST/SERVO/AT screen.
2. CENTER/ENABLE on the Test/Servo/AT screen.
3. Color bar tape.
4. Place the unit to STILL mode.
5. Set the AT head heights to zero from the front panel.

<STEP 2>

1. SCOPE CH1 : TP2610 Segment Pattern
SCOPE CH2 : TP2619 Pulse
VR2611 "STRGNA"
VR2612 "STRGNB"

<STEP 3>

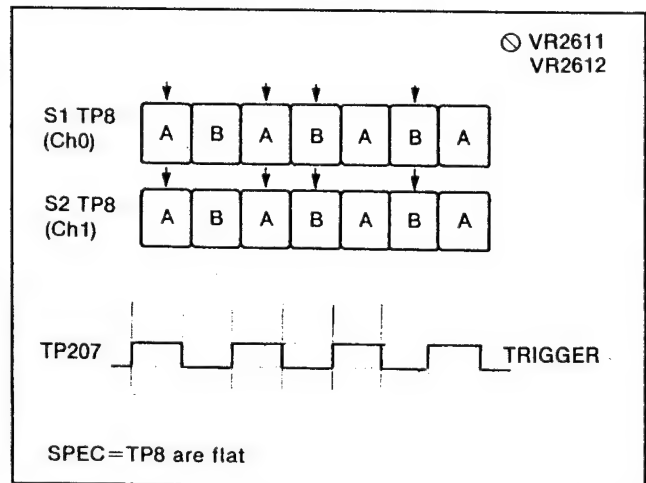
1. Adjust VR2611 & 2612 for Maximum RF level on the "envelope" bar graphs on the front panel while maintaining the proper timing relationship between the pulse and Segment waveforms, at the fourth step.
2. As a rough check, the voltage in the play mode should be approximately 0 volts at TP5006 & 5007, and the segment LED should be off.

<STEP 4>

1. Next, fine adjust the circuit as follows;
2. AT Play "Frame" on the SETUP/HOME screen or TEST/SERVO/AT screen.
3. CLOSE/CENTER/ENABLE
4. SW2601 CLOSED
5. Variable STILL mode (not play Still).

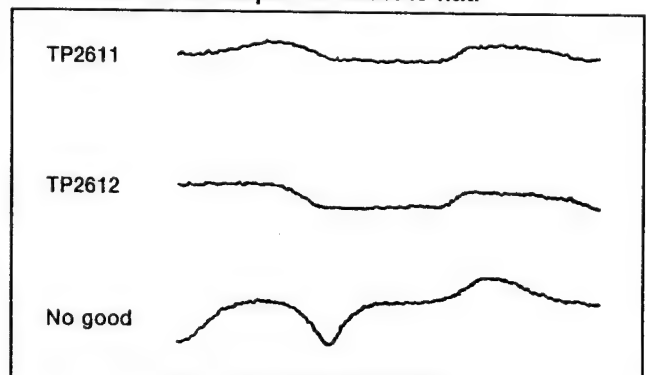
<STEP 5>

1. SCOPE CH1 : TP8 on the S1 board
SCOPE CH2 : TP8 on the S2 board
TP207 for triggering
(on the REC Amp Board).
2. Fine adjust VR2611 & 2612 for flatness in the detected envelope, and maximum envelope level on the front panel meter.



Note:

1. If output waveform of TP8 is not clear, connect the scope to CH1 to TP2611 and CH2 to TP2612 on the AT board.
2. Confirm that output DC level is flat.



8-13. STRAIN LOOP FREQUENCY RESPONSE ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2629[G1] --- A CH WFM OUT TP2630[H1] --- B CH (ENVELOPE) TP2619[E1] --- (H SW) TRIGGER,
MODE	VAR X1, -X1, SW2601=CLOSE, SEARCH=CENTER=Pattern=ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	Composite color bar to VIDEO IN
ADJ.	VR2619(TWN A)[H2], VR2621(LGN A)[H2] - A CH VR2620(TWN B)[H2], VR2622(LGN B)[H2] - B CH

<STEP 1>

- SCOPE CH1 : WFM OUT (ENV pattern)
CH2 : TP2619 (TRIG)
- Set the each VRS as follows.
VR2619, VR2620 : center position.
VR2621, VR2622 : fully counterclockwise

<STEP 2>

- Place the unit to VAR $\times 1$ mode.
- Set the AT height on the test menu to 1/3 level decrease (off track) from maximum envelope.
- Slowly turn VR2619 and VR2620 to clockwise until output envelope waving is increase.
- Adjust VR2619 and VR2620 to counterclockwise so that the output envelope waving is minimum.
- Confirm that the SEGM lamp is OFF.
- After confirmation, set the AT HEIGHT to 0.
- Set the VR2621 and VR2622 to fully clockwise.

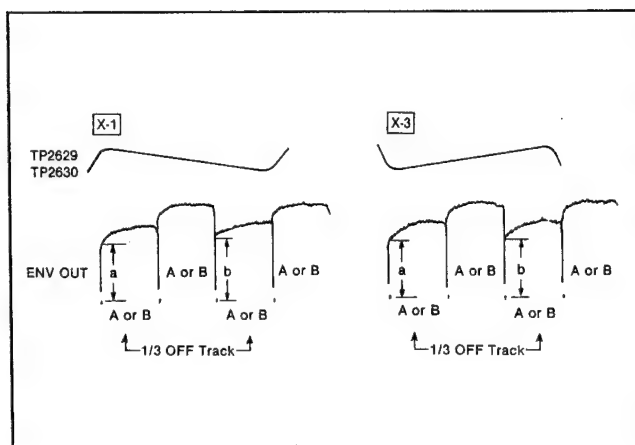
Note: Adjust each head (A, B) independently.

<STEP 3>

- Scope CH1 : WFM OUT (ENV pattern)
CH2 : TP2629, TP2630
CH3 : TP2619 (TRIG)
- Place the unit to VAR-X1 and VAR-X3.

<STEP 4>

- Set the AT height on the test menu to 1/3 level decrease (off track) from maximum envelope.
- Adjust VR2621 and VR2622 so that the droop of entrance side of output envelope is same level between a and b.



<STEP 5>

- Confirm that the SEGM lamp is OFF.
- After confirmation, set the AT HEIGHT to 0.

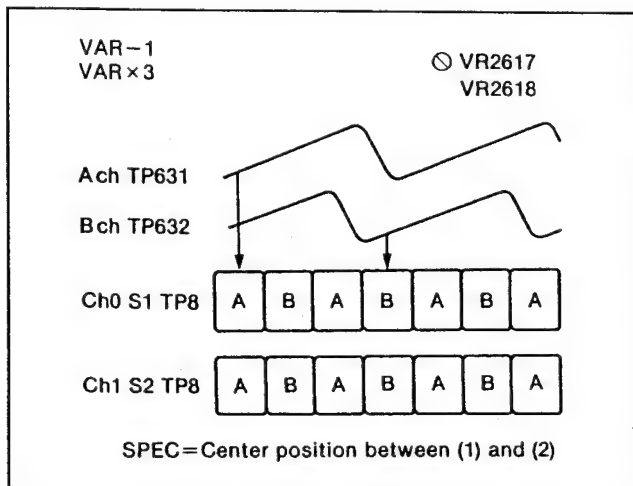
Note: Adjust each head (A, B) independently.

8-14. GROUP DELAY COMPENSATION ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP8[E2]→S1, TP8[E2]→S2, TP631[H2]→S4 TP632[I3] → S4
MODE	VAR × -1, × 3 → VAR ×1 ~ ×-3
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2617[D1], VR2618[E1]

<STEP 1>

1. AT Play Frame or Field.
2. SCOPE CH1 : TP8 on the S1 board.
SCOPE CH2 : TP8 on the S2 board.
SCOPE CH3 : TP2631
SCOPE CH4 : TP2632
3. Use the knob to activate the variable times 3 and variable times -1 modes, alternately.



4. Confirm that the output waveform is flat as shown in figure.
5. If it is not, adjust VR2617 and VR2618.

8-15. PRE READ CONFIRMATION (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2610[F1], TP2619[E1]
MODE	EDIT PLAY, SW2601-CLOSE, P523-ON AT TEST = NORMAL, PRE READ MODE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>

SCOPE CH1 : TP2610
SCOPE CH2 : TP2619

<STEP 2>

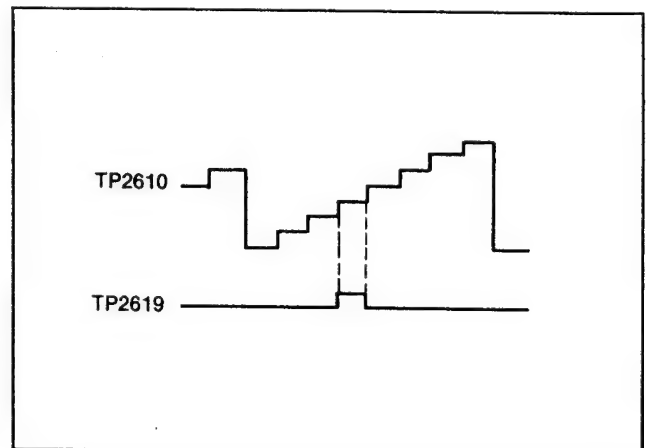
1. Set pre-read mode as follows.

HOME MENU → F + F8 (PRE READ ON) →
MANUAL EDIT MENU → F12 INSERT

2. Playback the alignment tape.

<STEP 3>

Confirm the pulse at TP2619 is located at 4TH (PAL), 3RD (NTSC) steps of TP2610 as shown below.



8-16. CONFIDENCE PB CONFIRMATION (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2610[F1], TP2619[E1]
MODE	CONFIDENCE PB HOME MODE, SW2601=CLOSE
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

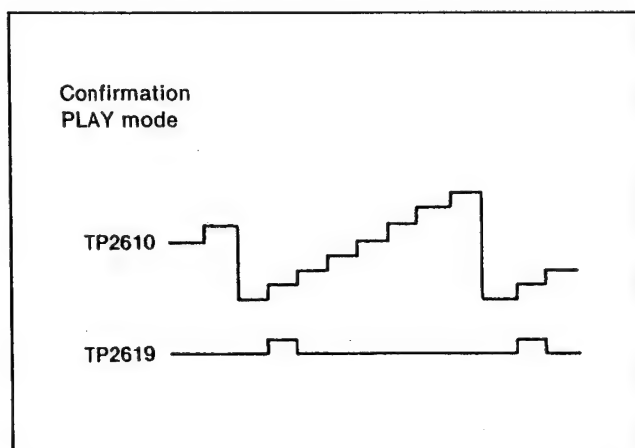
<STEP 1>

SCOPE CH1 : TP2610

SCOPE CH2 : TP2619

<STEP 2>

Confirm the pulse at TP2619 is located at Second steps of TP2610 as shown below.



FINAL CONFIRMATION OF AT ADJUSTMNET

SPEC	TP2619 PULSE IS LOCATED AS SHOWN IN FIGURE
TEST	TP2611[D1], TP2612[D1], TP2610[F1], TP2619(TRIGGER)[E1], TP5006, TP5007 (H.A REGULATOR)
MODE	VAR, FRAME STILL, SW2601 = CLOSE, P523 = ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR POSITION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2609 (STR OS A), VR2610 (STR OS B)[H1] VR2611[G1], VR2612[H1]

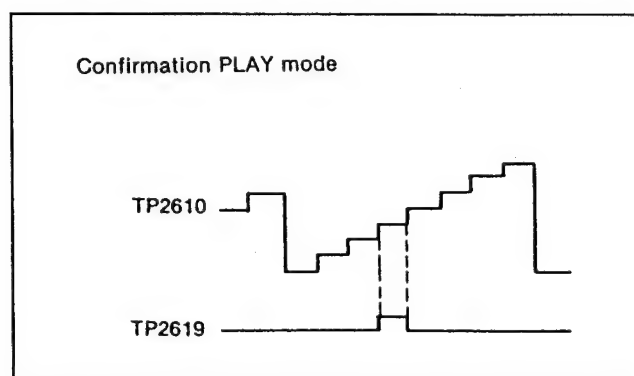
<STEP 1>

MACHINE CONDITION

1. VAR X1, P523 = ON, SW2601 = CLOSE
2. Set the AT mode, SEARCH = CENTER, PATTERN = ENABLE
3. Set the AT HEIGHT on the front panel, both A CH and B CH are 0.

<STEP 2>

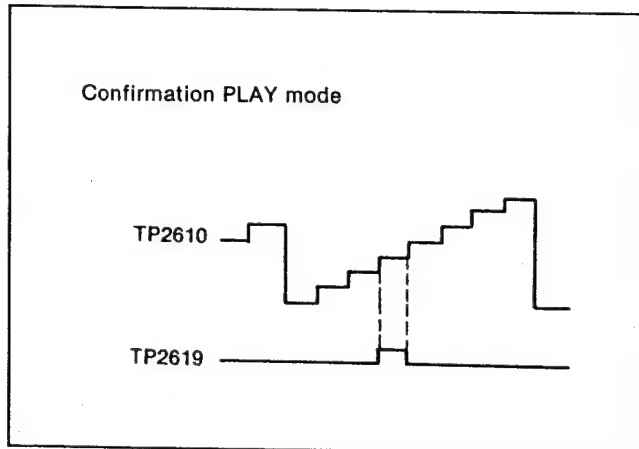
1. SCOPE CH1 : TP2610
CH2 : TP2619
CH3 : TP5006
(H.A REGULATOR Board)
CH4 : TP5007
(H.A REGULRATOR Board)
2. Confirm the waveform is as shown in Figure.
If it is not, adjust VR2609 and VR2610.
3. Confirm that the DC voltage is $0 \pm 50V$ DC.
4. Confirm that the envelope output is maximum on the front display.
5. If it is not Readjust VR2609 and VR2610. (Refer to item 8-11 AT HEIGHT (2) ADJUSTMENT)



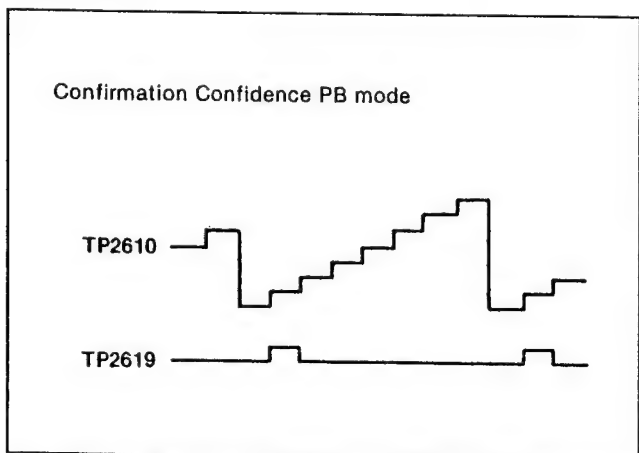
<STEP 3>

1. Set the AT mode to NORMAL (F1).
2. Place the unit in the PLAY mode.
3. Confirm the waveform is as shown in figure.

<STEP 4>



1. Place the unit in the Recording mode.
2. Confirm the waveform is as shown in figure.

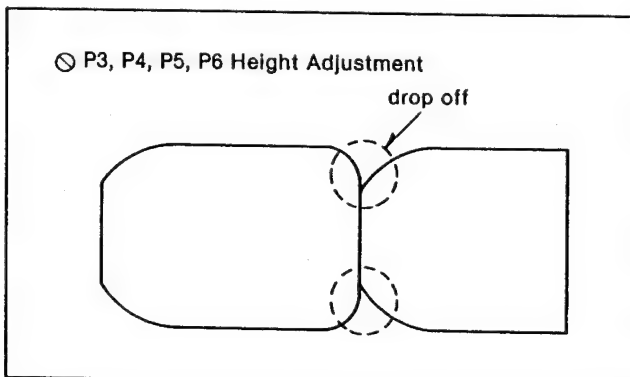
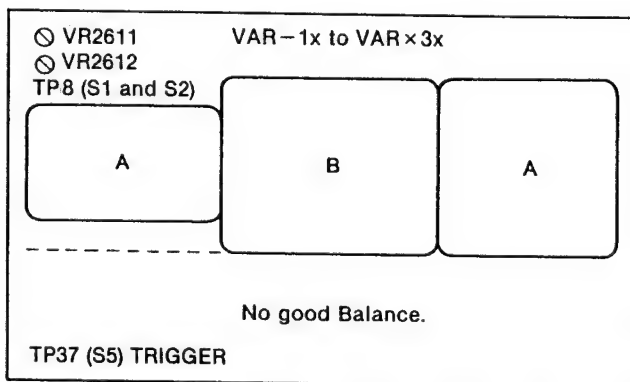


3. If it is not, readjust VR2609 and VR2610. (Refer to item 8-11 AT HEIGHT (2) adjustment)

NOTE: If the segment steps is mached the pulse and segment, Segment LED is OFF.

<STEP 5>

1. SCOPE CH1 : TP8 (S1) on the Equalizer Board.
CH2 : TP8 (S2) on the Equalizer Board.
CH3 : TP37 (S5) on the SERVO Board. (for trigger)
2. Confirm that the envelope is flat from VAR X-1 to VAR X3. And check the CH A and CH B envelope output balance.
Note: If the envelope drop off at entrance side and exit side, in this case re-check the tape pass linearity. (Refer to P3 or P6 Height adjustment)
3. If it is not, readjust VR2611 and VR2612. (Refer to item 8-15 GAIN adjustment)



9. SERVO (S5) BOARD

9-1. CAPSTAN FG AMP ADJUSTMENT (S5 : SERVO)

SPEC	FG DC BIAS = $6.0V \pm 0.2V$ DC
TEST	P2210-14C[D5], P2210-16C[D5], TP14[F4], TP17[C4]
MODE	EE1 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE DC mode
INPUT	
ADJ.	VR1[I4], VR2[I4]

<STEP 1>

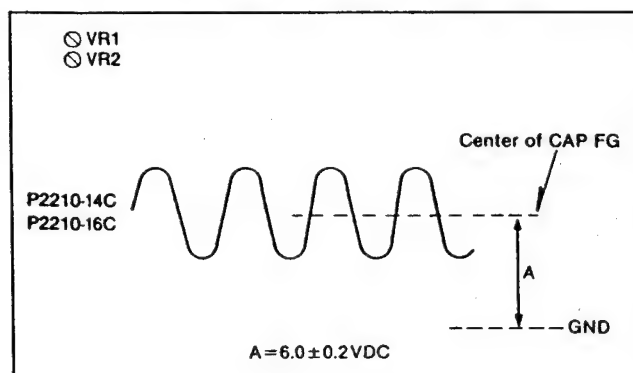
1. SCOPE : P2210-14C
2. Turn the capstan Motor by hand.
3. Adjust VR1 so that the center of CAP FG level A is $6.0V \pm 0.2V$ DC as shown in Figure.

<STEP 2>

1. SCOPE : P2210-16C
2. Turn the capstan Motor by hand.
3. Adjust VR2 so that the center of CAP FG level A is $6.0V \pm 0.2V$ DC as shown in Figure.

<STEP 3>

1. SCOPE CH1 : TP14
CH2 : TP17
2. Turn the capstan Motor by hand.
3. Confirm that the pulse is appeared on the scope.



9-2. TAKE UP REEL TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	T REEL TORQUE = $53gr.cm \pm 5gr.cm$
TEST	TAKE UP REEL
MODE	TAPE LOADING COMPLETION WITHOUT CASSETTE TEST MECH, NO FRLD
TAPE	SELF-RECORDING TAPE
M.EQ	DIAL TORQUE GAUGE(150g max.) --- VFK71 DIAL TORQUE GAUGE ADAPTOR--VFK0134 TENTELO METER --- VFK0132
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torquen Gauge and set the Dial Torque Gauge on the Gake Up Reel Motor.
4. Set the VTR into test mode.

TEST → SERVO → REEL → MEASURE → S.T

5. Place the unit in the STOP mode.
6. Place the unit into the Take Up Reel Torque Adjustment mode as shown below.

TEST → SERVO → REEL → F+F3

7. Adjust Front Panel adjustment VR so that the Take Up Reel Torque is within specification.

SPECIFICATION = $5.gr.cm \pm 5gr.cm$

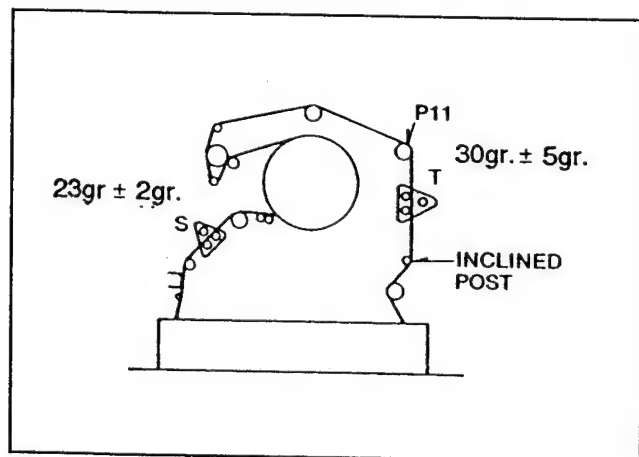
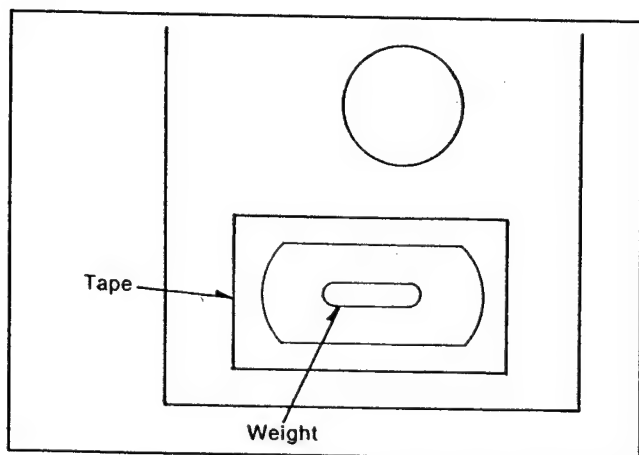
<STEP 2>

1. Insert a self recording tape.
2. Set the VTR into recording mode.
3. Adjust Take up Reel Torque so that the tension is within specification.

SPECIFICATION : $30gr.cm \pm 5gr.cm$

SPEC	1	2	3	4	5	6
Factory Set	ON	ON	OFF	OFF	OFF	ON
Service Mode	ON	ON	OFF	ON	OFF	ON

Service Switch



9-3. SUPPLY REEL TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	S REEL TORQUE = 45gr.cm ± 5gr.cm
TEST	SUPPLY REEL
MODE	TAPE LOADING COMPLETION WITHOUT CASSETTE TEST MECH, NO FRLD
TAPE	SELF-RECORDING TAPE
M.EQ	DIAL TORQUE GAUGE(150g max.) --- VFK71 DIAL TORQUE GAUGE ADAPTOR--VFK0134 TENVELO METER --- VFK0132
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torque Gauge and set the Dial Torque gauge, on the supply Reel Motor.
4. Set the VTR into Test mode.

TEST → SERVO → REEL → MEASURE → S.T

5. Place the unit in the STOP mode.
6. Place the unit into the Supply Reel Torque adjustment mode as shown below.

TEST → F8(SERVO) → F2(REEL) → F+F2(SREEL)

7. Adjust Front Panel adjustment VR so that the Supply Reel Torque is within specification.

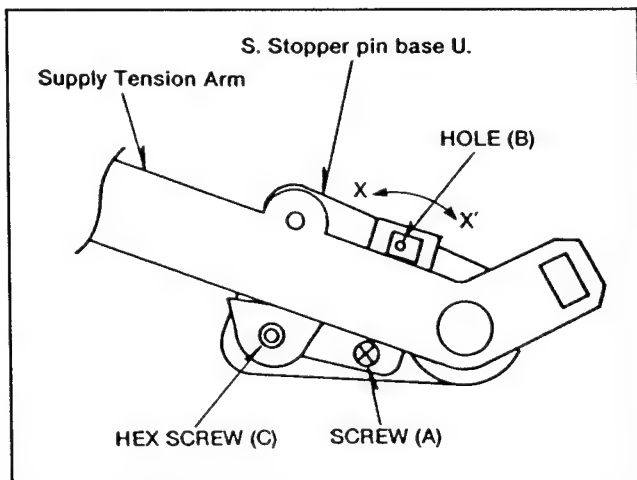
SPECIFICATION = 45gr.cm ± 5gr.cm

<STEP 2>

1. Insert a self recording tape.
2. Set the VTR into recording mode.
3. Adjust Supply Reel Torque so that the tension is within specification.

SPECIFICATION : 23gr.cm ± 2gr.cm (P2~P3)

4. If it is not within specification, loosen the screw (A).
5. Insert the Eccentric Screwdriver into Hole (B).
6. Adjust the position of S. Stopper Pin Base Unit so that the supply tension is 18gr.cm ~ 28gr.cm.
7. Insert the Hex Wrench to Hex Screw (C).
8. Adjust the position of S.Stopper Pin Base Unit so that the tension is 23 ± 2gr.
9. Tighten the screw (A), then reconfirm the tension after the screw (A) is tightened.



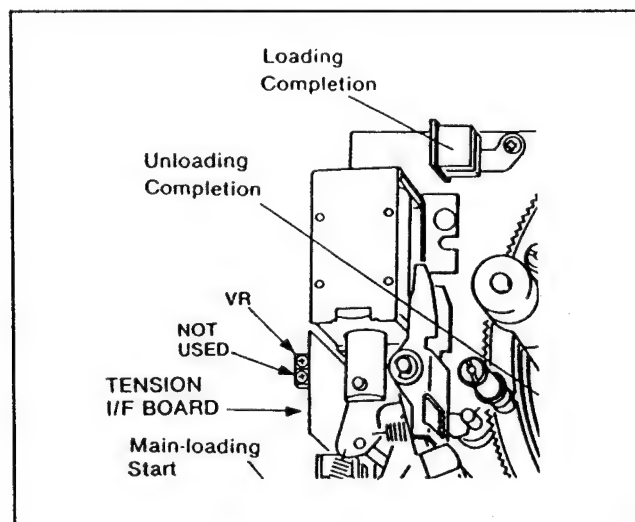
9-4. SENSOR AMP OFFSET ADJUSTMENT (S5 : SERVO)

SPEC	TP2201 = $2.5V \pm 0.001V$ DC
TEST	TP2201[G4]
MODE	EJECT
TAPE	
M.EQ	DIGITAL VOLT METER
INPUT	
ADJ.	VR (on the Tension I/F P.C.Board)

<STEP 1>

1. DIGITAL VOLT METER : TP2201
2. Adjustment VR on the Tension I/F P.C.Board so that the DC voltage is $2.5V \pm 0.001V$ DC.

SPECIFICATION = $2.5V \pm 0.001V$ DC



9-5. SUPPLY SENSOR VOLTAGE ADJUSTMENT (S5 : SERVO)

SPEC	TP2201 = $2.5V \pm 0.02V$
TEST	TP2201[G4]
MODE	EJECT → STOP → PLAY
TAPE	
M.EQ	DIGITAL VOLT METER, MECHANICAL NEUTRAL, ECCENTRIC SCREWDRIVER
INPUT	
ADJ.	SUPPLY MAGNET SENSOR BASE UNIT POSITION

<STEP 1>

1. Turns power off.
2. Remove the cassette compartment.
3. Turns power on.
4. Set the VTR into Mech Test mode as shown below.

TEST → MECH → NO TAPE → M CASSETTE

5. Remove the P3 Stopper from the Mech Neutral Plate and set the Mech Neutral Plate on the Reel Table.
6. Press STOP key to set the loading completion mode.

<STEP 2>

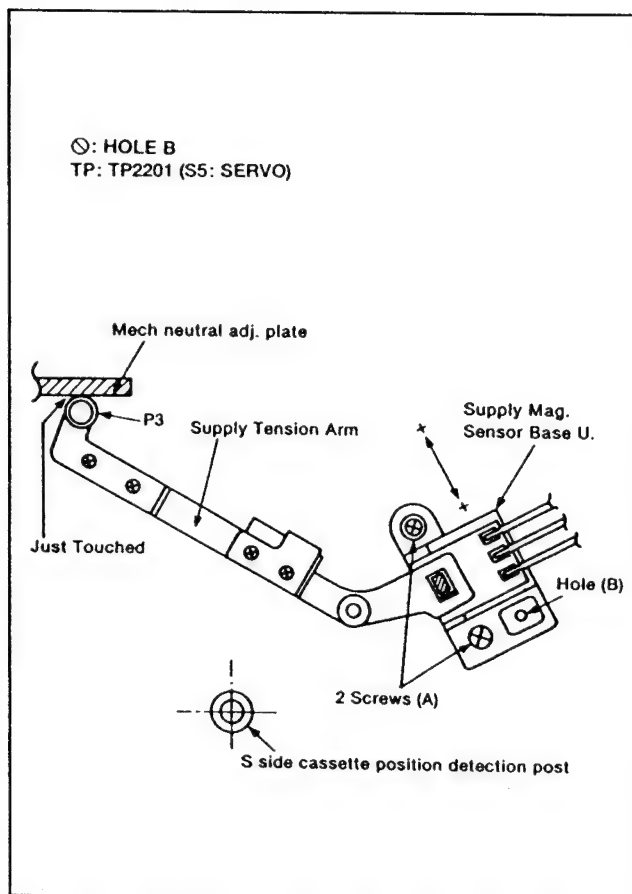
1. Make sure that the P3 post touches the arm of the Mechanical Neutral Plate as shown in Figure.
2. Confirm that the voltage at TP2201 is $2.5V \pm 0.001V$.
3. If it is not, loosen 2 screws (A) and insert the eccentric screw driver into hole (B).
4. Adjust the position of the Supply Magnet Sensor Base Unit until the voltage at TP2201 is in specification.

SPECIFICATION : $2.5V \pm 0.015V$

5. Tighten the 2 screws (A) and make sure the voltage at TP2201 does not change.
(Make sure the voltage at TP2201 does not change.)

<STEP 3>

1. Place the unit in the PLAYBACK mode.
2. Confirm that the voltage at TP2201 (V_s) $\pm 0.002V$.
3. If it is not, adjust the Supply Magnet sensor Base Unit, follow the procedure in <STEP 3>.



9-6. LOADING TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	LOADING TORQUE = 60gr.cm \pm 2gr.cm
TEST	TAKE UP REEL
MODE	
TAPE	
M.EQ	REEL TORQUE METER
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torque Gauge and set the Dial Torque Gauge on the Take Up Reel Motor.
4. Set the VTR into Mechanism Test mode.

TEST → SERVO → REEL → MEASURE → L

5. Place the unit in the STOP mode.
6. Place the unit into the Take Up Reel Torque Adjustment mode as shown below.

TEST → F8 (SERVO) → F2 (REEL) → F + F1 (LOADING)

7. Adjust Front Panel adjustment VR so that the Take Up Reel Torque is within specification.

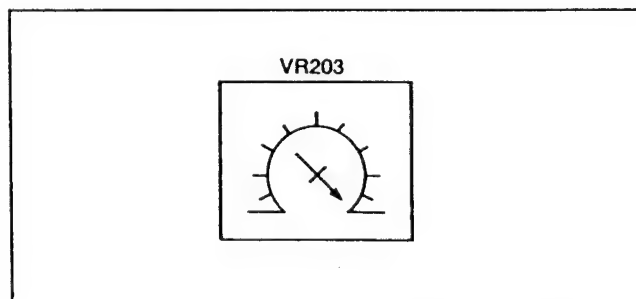
SPECIFICATION = 60gr.cm \pm 2gr.cm

9-7. CONFIRM THAT THE CAPSTAN ERROR MIX RATE VR (S5 : SERVO)

SPEC	
TEST	
MODE	
TAPE	
M.EQ	
INPUT	
ADJ.	VR203[G1], VR2011[]

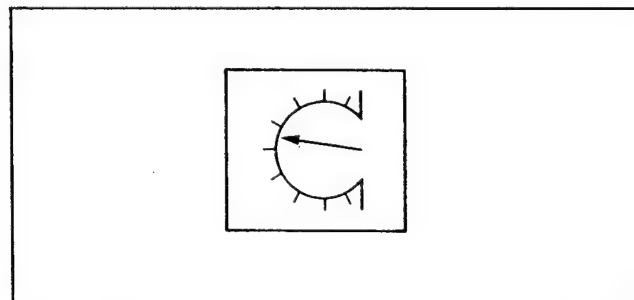
<STEP 1>

1. Turn VR203 to fully clockwise.



<STEP 2>

1. Set VR2011 to 5.5 division.



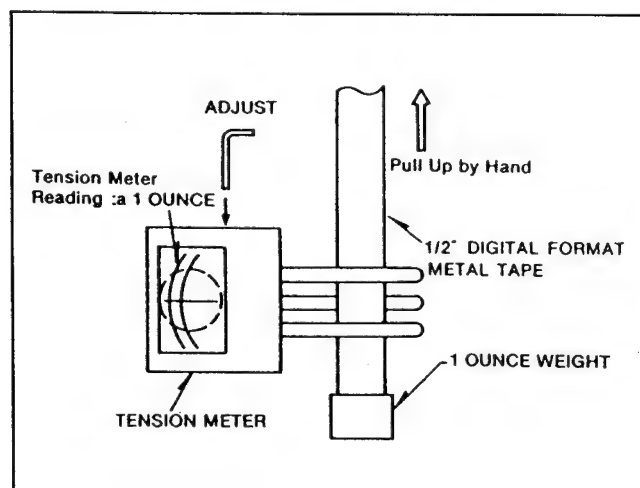
9-8. SUPPLY (FWD.) TENSION ADJUSTMENT (S5 : SERVO)

SPEC	TENSION = $23g \pm 2g$
TEST	"A" (P2 ~ P3), TP2201[G4]
MODE	PLAY → STOP
TAPE	BLANK 90min TAPE BEGINNING PORTION
M.EQ	TENSION METER, DIGITAL VOLT METER
INPUT	
ADJ.	SUPPLY STOPPER PIN BASE UNIT

<STEP 1>

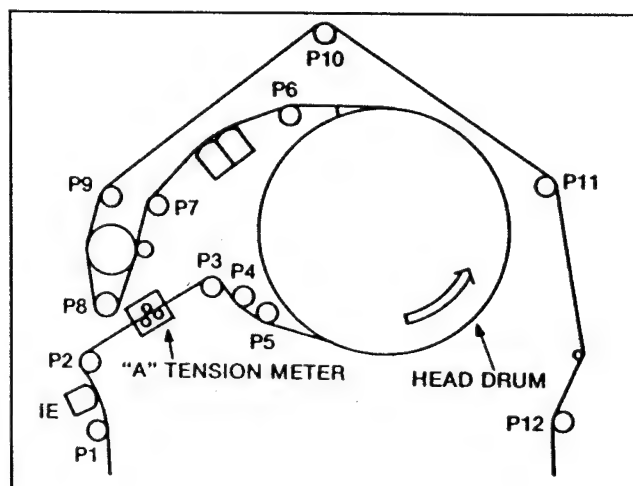
Calibration of Tension meter

1. Before performing of the tape tension adjustment. The Tension Meter should be checked as follows.
2. Use 1/2" Digital Metal tape and a 1 ounce weight.
3. Pull up a tape by hand as shown in Figure.
4. Adjust a Hex screw on the Tension Meter so that the tension meter reading is set for a 1 ounce.



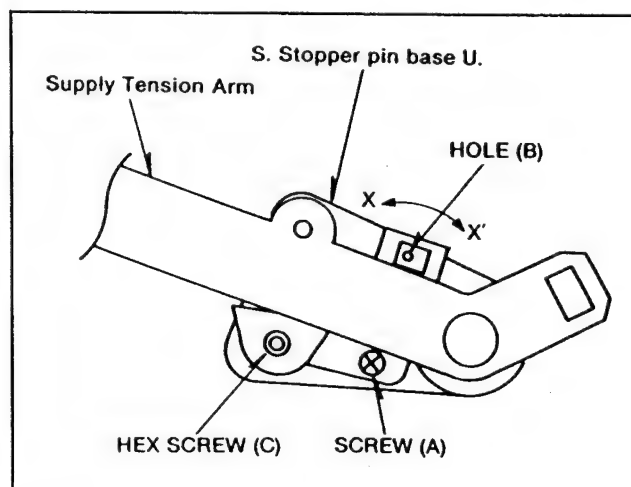
<STEP 2>

1. Insert the tension meter to between P2 and P3 post (portion "A") as shown in Figure.
2. Mode : PLAY, M cassette 90 min.
3. Confirm that the tape tension is $23 \pm 2g$ at the tape beginning portion.



<STEP 3>

1. If it is not within specification, loosen the screw (A).
2. Insert the eccentric screwdriver into Hole (B).
3. Adjust the position of S.Stopper Pin Base Unit so that the supply tension is 18gr ~ 28gr.
4. Insert the Hex Wrench to Hex screw (C).
5. Adjust the position of S.Stopper Pin Base Unit so that the tension is $23 \pm 2g$.
6. Finally, tighten the screw (A).
7. Reconfirm the tension after the screw (A) is tightened.



<STEP 4>

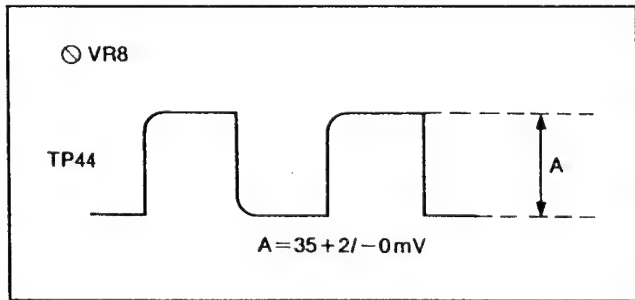
1. Place the unit in STOP mode.
(Loading completed condition.)
2. SCOPE : TP2201
3. Confirm that the sensor voltage is $(2.5V) \pm 250mV$.

9-9. CTL REC CURRENT ADJUSTMENT
(S5 : SERVO)

SPEC	TP44 = 35mV + 2mV/-0mV
TEST	TP44[H4], PROBE 1:1, GND = TPG5[G4]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8[G2]

<STEP 1>

1. SCOPE : TP44
2. Adjust VR8 so that the REC CTL pulse is 35 +2/-0 mV as shown in Figure.

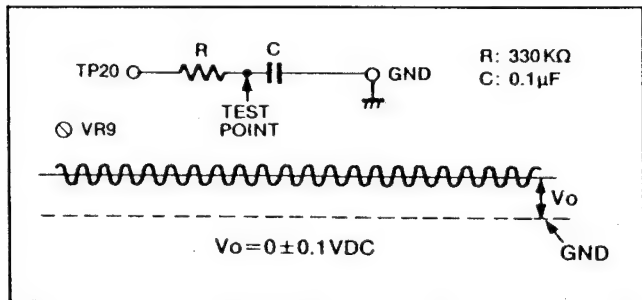


9-10. CONTROL PLAYBACK AMP
OFFSET ADJUSTMENT
(S5 : SERVO)

SPEC	TP20 + (CR) = 0V ± 0.1V DC
TEST	TP20[H1] ... REFER TO FIGURE
MODE	VAR 0.04
TAPE	NO SIGNAL RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR9[H2]

<STEP 1>

1. SCOPE : TP20
2. Adjust VR9 so that the DC level is 0 ± 0.1V DC.

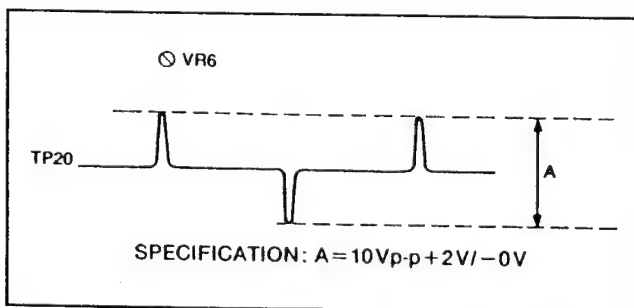


9-11. CTL PLAYBACK AMP GAIN ADJUSTMENT (S5 : SERVO)

SPEC	TP20 = 10Vpp +2V/-0V
TEST	TP20[H1]
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR6[H1]

<STEP 1>

1. SCOPE : TP20
2. Supply a color bar signal to Video Input and recorded.
3. Playback a just recorded portion.
4. Adjust VR6 so that the signal level A is 10 +2 Vp-p.
5. Confirm that the CF MODE and SERVO LED on the Front Panel turned on.

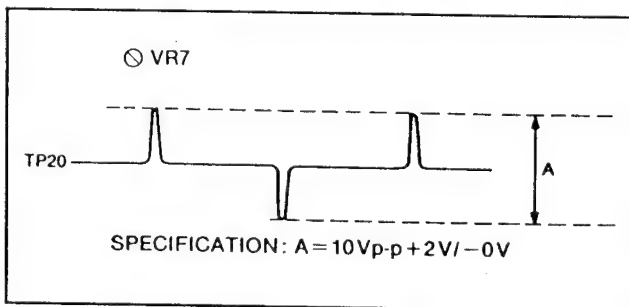


9-12. CTL PLAYBACK AMP F/V GAIN ADJUSTMENT (S5 : SERVO)

SPEC	TP20 = 10Vpp +2V/-0V
TEST	TP20[H1]
MODE	REC PLAY → VAR SPEED : × 0.52
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR7[F3]

<STEP 1>

1. SCOPE : TP20
2. Supply a color bar signal to Video Input and recorded.
3. Playback a just recorded portion by VAR × 0.52.
4. Adjust VR7 so that the signal level A is 10 +2 Vp-p.

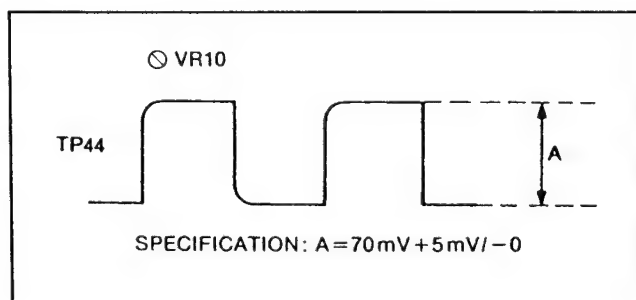


9-13. CTL REC CURRENT ADJUSTMENT (S5 : SERVO)

SPEC	TP44 = 70mV +5mV/-0mV
TEST	TP44[H4], PROBE 1:1, GND=TPG5[G3 or G4]
MODE	REC PLAY FAST FORMAT × 3 MODE
TAPE	SELF RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR to VIDEO IN
ADJ.	VR10[G1]

<STEP 1>

1. SCOPE : TP44
2. Place the unit in the Fast Format (X3) mode.
3. Adjust VR10 so that the signal level A is 70mV + 5mV/0mV.



Cf:
Fast Format (X3) mode
HOME
SET UP
FORMAT
EXECUTE

9-14. PG SHIFTER ADJUSTMENT (S5:SERVO)

SPEC	T=25.5±0.5μsec
TEST	TP11 (REC AMP) TP37 (SERVO)
MODE	PLAY
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	SW2[F2], SW3

<STEP 1>

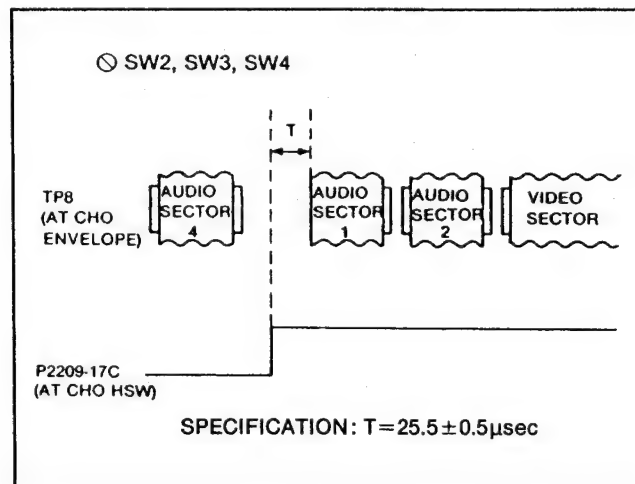
MENU CONDITION

TEST MENU

Select the TRACKING FIX/VAR F10 to "FIX".

<STEP 2>

1. SCOPE CH1 : TP11 (REC AMP)
SCOPE CH2 : TP37 (SERVO)
2. SCOPE TRIGGER : CH2
3. Adjust SW2, 3 and 4 so that the period T is as shown in Figure.



SW2: Fine adjustment
SW3: Pre fine adjustment
SW4: Coarse adjustment

10. TIME CODE SECTION

10-1. SUPER C CURRENT ADJUSTMENT (S6 : TIME CODE)

TEST	VIDEO OUT 3, TV MONITOR
MODE	EE1, EJECT
TAPE	
M.EQ	TV MONITOR
INPUT	75% COLOR BAR
ADJ.	VR1[B1]

<STEP 1>

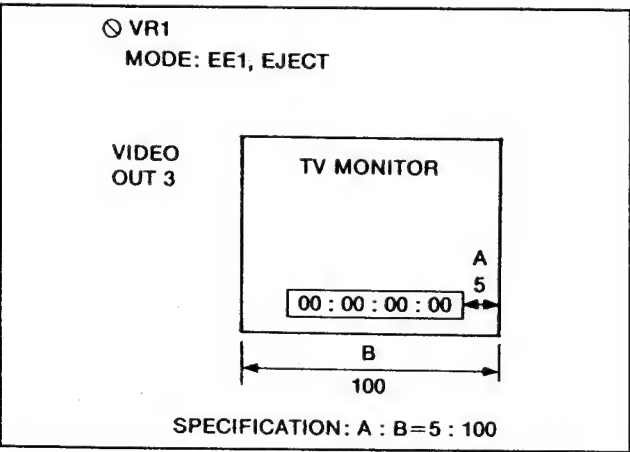
1. Set the VTR EE1 and EJECT mode.
2. Connect the TV monitor to VIDEO OUT 3.
3. Confirm the Time Code super is displayed o the monitor.

<STEP 2>

1. Set TC/CHR mode.
2. Set the POSITION (F1) from FIX to ARRANGE.
3. Press CURSOR RIGHT many times until the Time Code super reaches the right side of the TV monitor.

<STEP 3>

1. Adjust VR1 so that the Time Code super is displayed at right side of the monitor as shown in Figure.



10-2. PB LTC LEVEL ADJUSTMENT (S6 TIME CODE SUB)

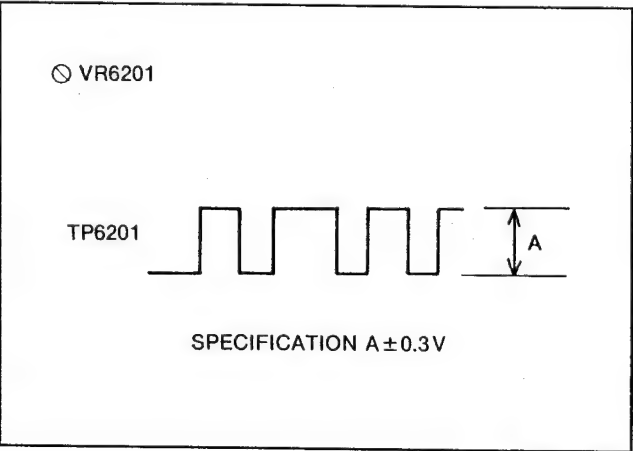
TEST	TP6201
MODE	PLAY
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	oscilloscope
INPUT	
ADJ.	VR6201

<STEP 1>

1. Place the VTR in the SHTL × 4mode.
2. Verify that the LTC level A as shown in figure.

<STEP 2>

1. Place the VTR in the normal play mode.
2. Adjust VR6201 so taht the LTC level is same as A level of SHTL × 4 mode.



12. AUDIO PROCESS (S8) BOARD

12-1. DIGITAL AUDIO INTERFACE (1) ADJUSTMENT (S8 : AUDIO PROCESS)

TEST	TP401[H3]
MODE	EE (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN CH1 (L) 1kHz -18dB, CH2 (R) 2kHz -18dB DIGITAL AUDIO to DIGITAL AUDIO IN
ADJ.	VR401[A2], VR403[A1]

4000 SERIES

<STEP 1>

1. SCOPE : TP401
2. Confirm that the level is High (+5V).
3. If it is not, adjust VR401 and VR403 so that the level is High (+5V).
4. Confirm that the level is always High (+5V), when turn the power ON.

<STEP 2>

1. Disconnect the Digital Audio Input Connector.
2. Confirm that the level is LOW (0V).

12-2. DIGITAL AUDIO INTERFACE (2) ADJUSTMENT (S8 : AUDIO PROCESS)

TEST	TP402[I3]
MODE	EE (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN CH3 (L) 1kHz -18dB, CH4 (R) 2kHz -18dB DIGITAL AUDIO to DIGITAL AUDIO IN
ADJ.	VR402[A3], VR404[A2]

<STEP 1>

1. SCOPE : TP402
2. Confirm that the level is High (+5V).
3. If it is not, adjust VR402 and VR403 so that the level is High (+5V).
4. Confirm that the level is always High (+5V), when turn the power ON.

<STEP 2>

1. Disconnect the Digital Audio Input Connector.
2. Confirm that the level is LOW (0V).

12-3. CUE METER OFFSET ADJUSTMENT (S8 : AUDIO PROCESS)

SPEC	LESS THAN -50dB
TEST	CUE METER
MODE	STOP
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR4551[B4]

<STEP 1>

1. Set the VTR EE1 and STOP mode.
2. Adjust VR4551 so that the cue meter is less than -50dB.

13. VIDEO A/D PLL (S9) BOARD

Adjust with this section, perform after completed adjustment with L1 and L4 section.

MENU CONDITION

AUDIO IN MENU

Select the VIDEO INPUT F3 to "ANALOG"

VIDEO OUT SET UP MENU

Select the VIDEO STANBY OFF to "EE2"

STANBY OFF

VIDEO : TAPE, EE1, *EE2

MENU CONDITION

TEST MENU

VIDEO FUNCTION

Pless the SCH F10 Key on the Front

Panel and display the INPUT REF SCH METER.

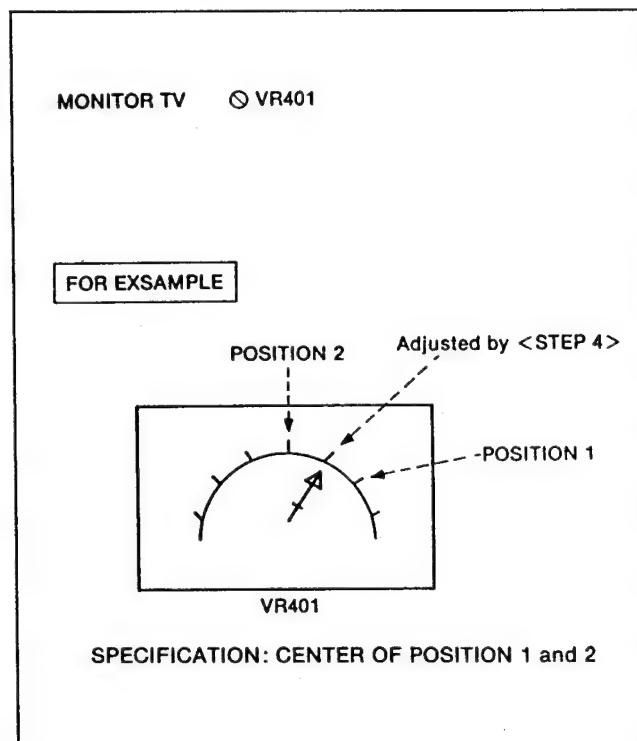
13-1. INPUT PLL ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	REFER TO FIGURE
TEST	MONITOR TV
MODE	EE2 (EJECT)
TAPE	
M.EQ	MONITOR TV
INPUT	ANALOG COLOR BAR to VIDEO IN
ADJ.	VR401 (PLL ADJ.)[G4]

8000 SERIES

<STEP 4>

- Set the VR401 in centered (position 1) and (position 2) sa shown in Figure.



<STEP 1>

- Connect the MONITOR TV to VIDEO OUT 1.
- Confirm that the E-E picture is synchronized on Monitor TV.
- If the E-E picture is not synchronized on Monitor TV, adjust VR401 follow the below adjustment procedure.

<STEP 2>

- Turn VR401 fully clockwise and turn power OFF and ON.
- Slowly turn VR401 to counter clockwise and adjust VR401 so that the E-E picture synchronized on Monitor TV.
- Memorized position of VR401 as shown in Figure (Position 1).

<STEP 3>

- Turn VR401 fully clockwise and turn power OFF and ON.
- Slowly turn VR401 to counter clockwise and adjust VR401 so that the E-E picture synchronized on Monitor TV.
- Memorized position of VR401 as shown in Figure (Position 2).

13-2. CF ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	2.6V \pm 0.1V
TEST	IC609 Pin4
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR SIGNAL
ADJ.	VR602[H3]

<STEP 1>

- SCOPE CH1 : IC609 Pin4
- Adjust VR602 so that the output level is 2.6V \pm 0.1V.

13-3. SCH ADJUSTMENT (S9 : VIDEO A/D PLL)

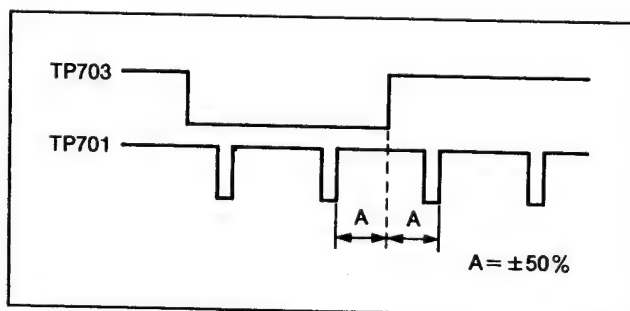
SPEC	AS SHOWN FIGURE
TEST	TP701 [G2], TP703 [G1]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR SIGNAL TO REF INPUT AND VIDEO IN
ADJ.	VR701[G1]

<STEP 1>

- SCOPE CH1 : TP703 (TRIGGER)
CH2 : TP701
- Set the SW701 to ON.

<STEP 2>

- Turn VR701 to clockwise.
- Adjust VR701 so that the waveform phase is as shown in figure.



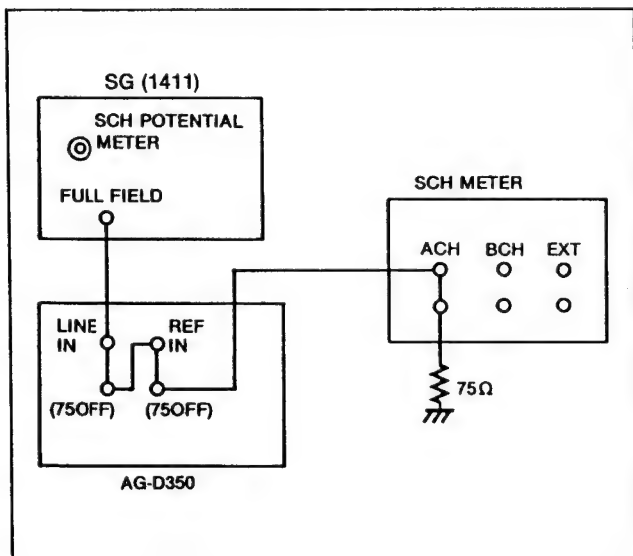
13-4. INCOME CF DETECTION ADJUSTMENT (1) (S9 : VIDEO A/D PLL)

SPEC	ALTERNATE +90° and -90°
TEST	INPUT SCH METER on TEST VIDEO MUNU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1411 COLOR BAR to VIDEO IN
ADJ.	VR702 (SCH DET 2)[G1] VR705 (SCH GAIN)[I2] VR706 (SCH OFFSET)[I2]

<STEP 1>

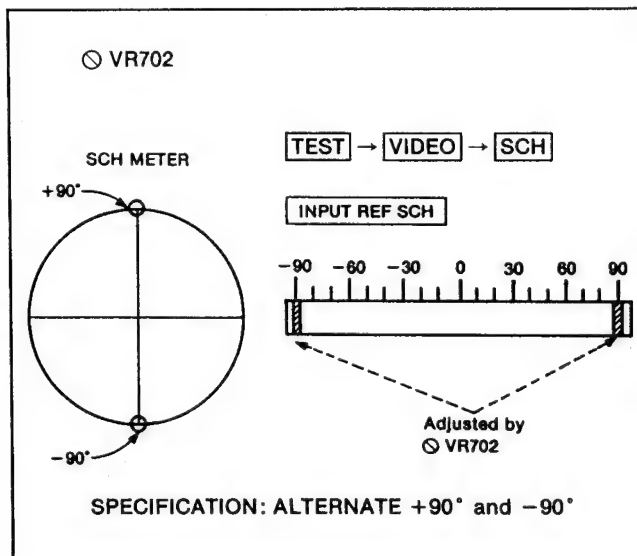
1. CONNECTION
2. CONFIRMATION

Confirmation that the SCH phase on SCH METER.



<STEP 2>

1. Set VR705 and VR706 to center position.
2. Adjust the Potential Meter on 1411 so that the SCH is +90° or -90° by turns.
3. Turn VR702 to fully clockwise.
4. Display the INPUT REF SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
5. Adjust VR702 so that the INPUT REF SCH METER displayed +90° and -90° by turns.
6. After finished this adjustment, perform 13-15 SCH METER ADJUSTMENT.

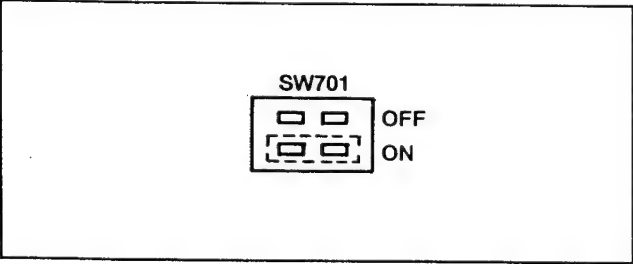


13-5. SCH METER ADJUSTMENT (S9 : VIDEO A/D PLL)

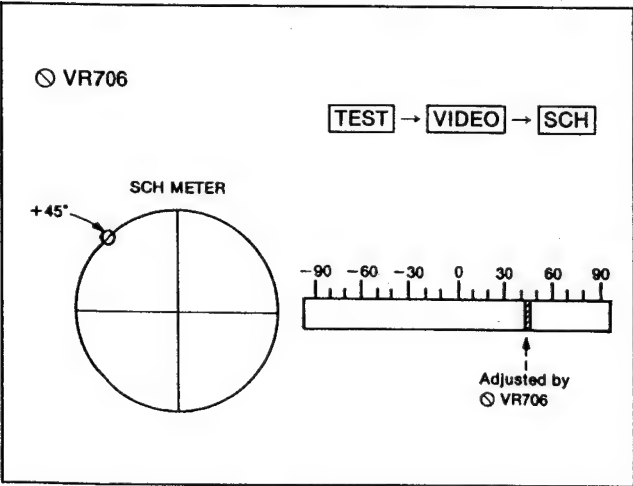
SPEC	
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1411 COLOR BAR to VIDEO IN
ADJ.	VR705 (SCH GAIN)[I2], VR706 (SCH OFFSET)[I2]

<STEP 1>
MACHINE CONDITION
 Refer to <STEP 1> on item 13-2.

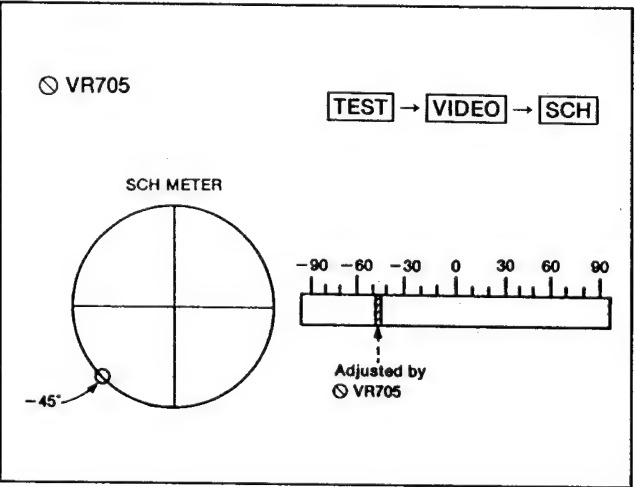
<STEP 2>
 1. Confirm that the SCH of SW701 is set to ON position.



<STEP 3>
 1. Set the SW701 to ON side as shown in Figure.
 2. Adjust the Potention Meter VR on 1411 so that the SCH is +45° at SCH METER.
 3. Display the INPUT SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
 4. Adjust VR706 so that the INPUT SCH METER displayed +45°.



<STEP 4>
 1. Adjust the Potention Meter VR on 1410 so that the SCH is +45° at SCH METER.
 2. Display the INPUT SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
 3. Adjust VR705 so that the INPUT SCH METER displayed -45°.



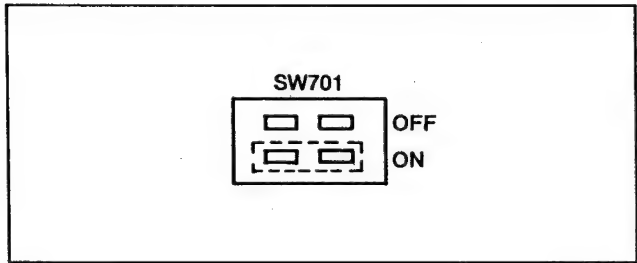
<STEP 5>
 1. Re-adjust above <STEP 3> and <STEP 4> until stabilize the SCH indication.

**13-6. INPUT SCH DETECTION
ADJUSTMENT
(S9 : VIDEO A/D PLL)**

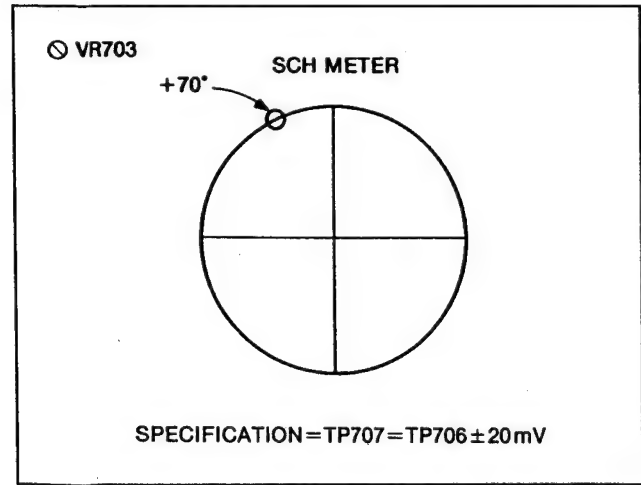
SPEC	Voltage at TP707, TP708 = TP706 \pm 20mV
TEST	TP706[I1], TP707[I1], TP708[I2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER OSCILLOSCOPE
INPUT	1411 75% COLOR BAR to VIDEO IN
ADJ.	VR703 (SCH - H)[I2], VR704 (SCH - L)[I2]

<STEP 1>
MACHINE CONDITION
Refer to <STEP 1> on item 13-2.

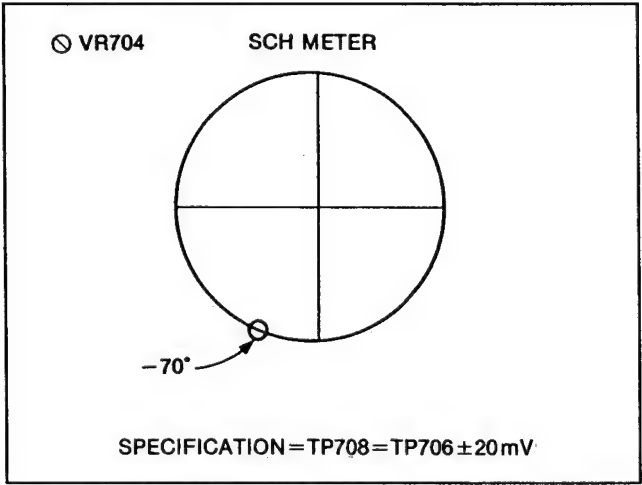
<STEP 2>
1. Confirm that the SCH of SW701 is set to ON position.



<STEP 3>
1. SCH METER : SCH mode
2. Adjust the Potention Meter VR on 1411 so that the SCH is +70° at SCH METER.
3. SCOPE CH1 : TP707
CH2 : TP706
4. Measure the voltage at TP706.
5. Adjust VR703 so that the DC voltage at TP707 is TP706 \pm 20mV.



<STEP 4>
1. Adjust the Potention Meter VR on 1411 so that the SCH is -70° at SCH METER.
2. SCOPE CH1 : TP708
CH2 : TP706
3. Adjust VR703 so that the DC voltage at TP708 is TP706 \pm 20mV.

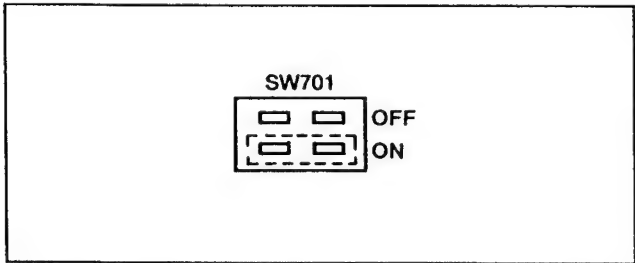


13-7. INCOME CF DETECTION
ADJUSTMENT
(S9 : VIDEO A/D PLL)

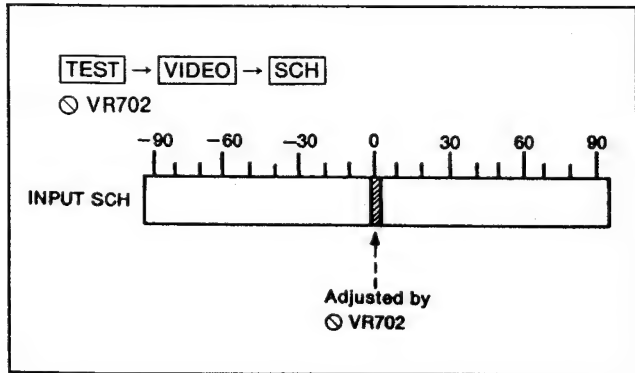
SPEC	FRONT SCH METER DISPLAY 0°
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR702 (SCH DET 2)[G1]

<STEP 1>
MACHINE CONDITION
Refer to <STEP 1> on item 13-2.

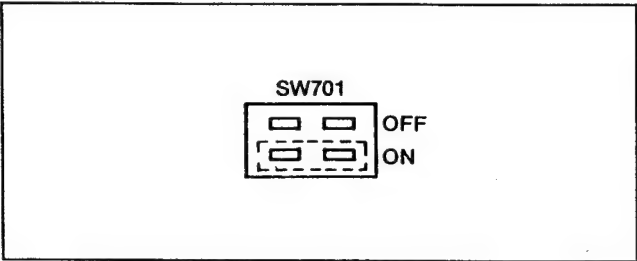
<STEP 2>
1. Confirm that the SCH of SW701 is set to ON position.



<STEP 3>
1. Turn the power OFF and ON.
2. Display the OUT REF SCH METER as refer to MENU
CONDITION 2 at the beginning of this SECTION.
3. Adjust VR702 so that the OUT REF SCH METER
displays 0°.



<STEP 4>
1. Confirm that the SW701 is set to ON position.

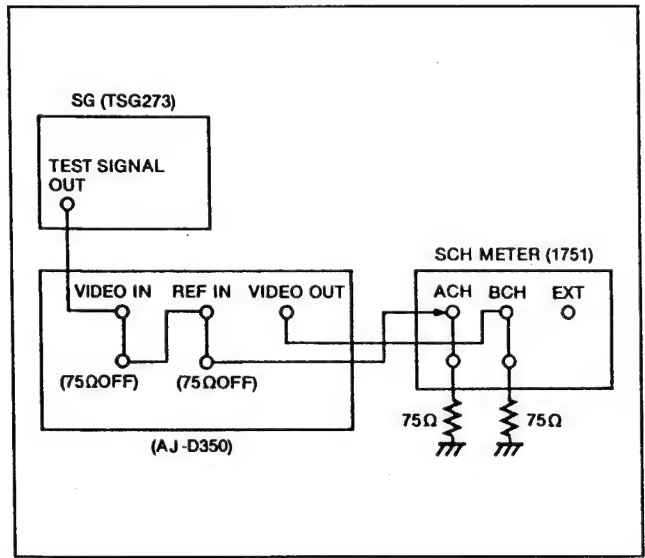


13-8. VIDEO PHASE ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	REFER TO FIGURE
TEST	VIDEO OUT IC611-Pin 2, TP401[G2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER OSCILLOSCOPE
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR601 (H PHASE)[G2]

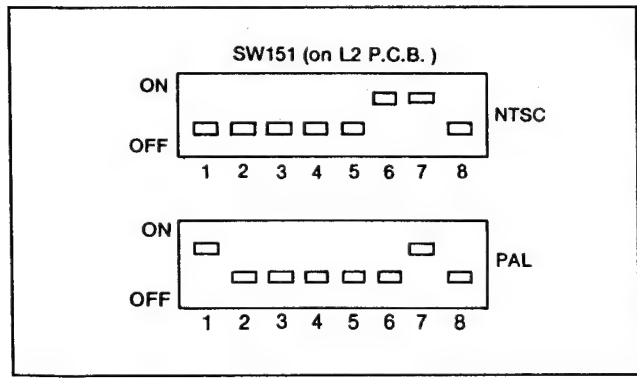
<STEP 1>

1. Connect the VTR as follows.



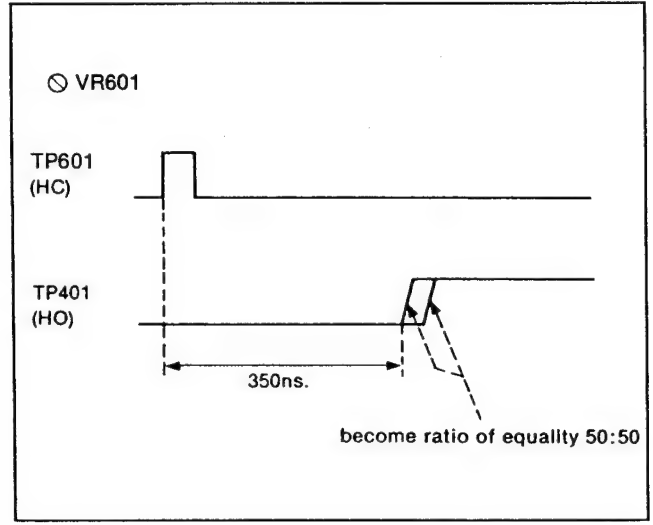
<STEP 2>

1. Set the Dip SW 151 on the L2 P.C.B. as follow as shown in Figure.



<STEP 3>

1. SCOPE CH1 : TP601
CH2 : TP401
2. Adjust VR601 so that the relation between HC and HO signal as shown in Figure.

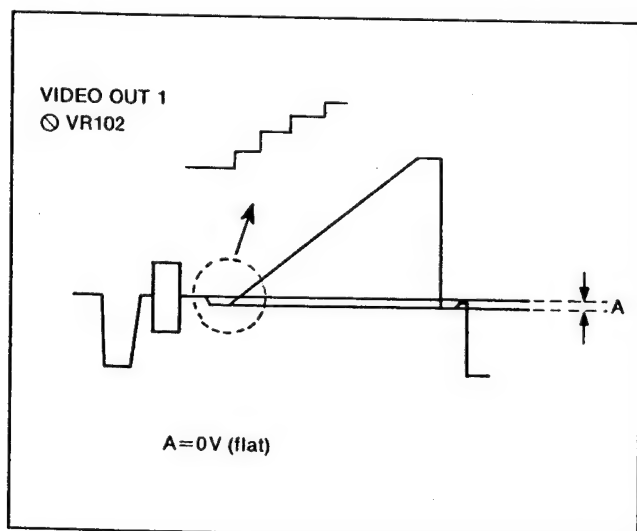


13-9. VIDEO INPUT CLAMP ADJUSTMENT (S9 ; VIDEO A/D PLL)

SPEC	A = 0V (FLAT)
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL RAMP SIGNAL to VIDEO IN
ADJ.	VR102 (CLAMP DC)[B3]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust VR102 so that the A portion is flat as shown in Figure.

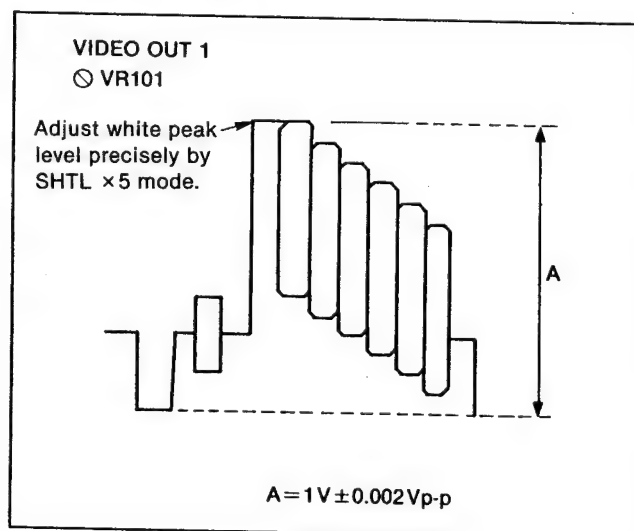


13-10. VIDEO INPUT LEVEL ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	VIDEO OUT 1 = $1V \pm 0.002V_{pp}$
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR101 (A/D LEVEL)[A3]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust VR101 so that the Video Level (A) is $1 \pm 0.002V$ as shown in Figure.



<STEP 2>

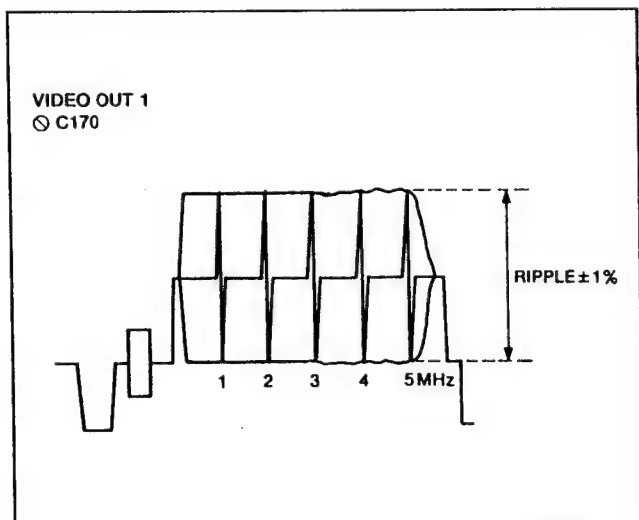
1. Expand WFM monitor by $\times 5$ mode.
2. Confirm that there are 3 stairs in the 5 divisions of WFM monitor as shown in figure.

13-11. VIDEO INPUT FREQUENCY ADJUSTMENT (1) (S9 : VIDEO A/D PLL)

SPEC	RIPPLE $\pm 1\%$
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL H SWEEP to VIDEO IN
ADJ.	C170[A2]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust C170 so that level from 1MHz to 4MHz is flat as shown in Figure.

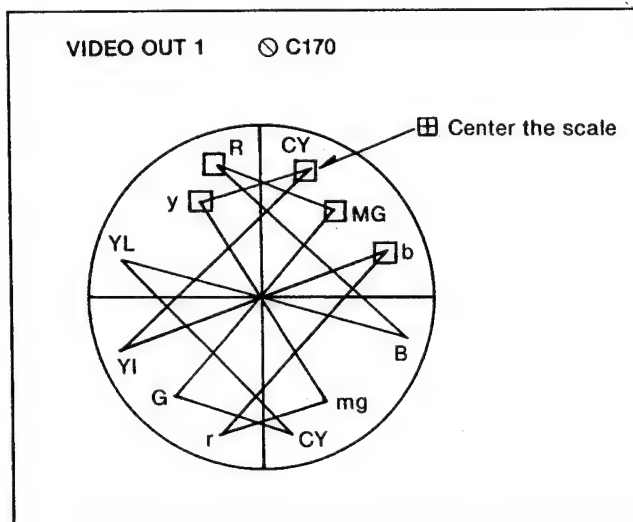


13-12. VIDEO INPUT FREQUENCY ADJUSTMENT (2) (S9 : VIDEO A/D PLL)

SPEC	CENTER OF THE SCALE
TEST	VIDEO OUT 1
MODE	E-E (EJECT)
TAPE	
M.EQ	VECTOR SCOPE
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	C170[A2], VR103[B3]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust C170 so that each vector level is in center the scale of vector scope.
3. Adjust VR103 so that the each vector dot is in center of the box.



13-13. INPUT LEVEL METER ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	INPUT LEVEL METER = 0dB
TEST	INPUT LEVEL METER
MODE	E-E (EJECT)
TAPE	
M.EQ	
INPUT	(TSG273) 100% COLOR BAR to VIDEO IN
ADJ.	VR201 (BOT DC ADJ.)[D2], VR202 (AD VRT ADJ.)[D3]

<STEP 1>

MENU CONDITION

VIDEO IN MENU : F5

Select the LEVEL DET to "PEAK".

<STEP 2>

1. Adjust VR202 so that the VIDEO INPUT LEVEL METER is 0dB.

<STEP 3>

MENU CONDITION

VIDEO IN MENU : F5

Select the LEVEL DET to "SYNC".

<STEP 4>

1. Adjust VR201 so that the VIDEO INPUT LEVEL METER is 0dB.

14. REC AMP BOARD

Confirm that the Machine Condition with L2, L3, L4, S1 and S2 board, refer to Machine Condition at the beginning of SECTION 5 (REC/PLAY CH0/CH1)

14-1-(1). REC 2nd HARMONICS DISTORTION ADJUSTMENT (1) (REC AMP)

SPEC	MINIMUM 2ND HARMONICS
TEST	TP3 (CH0 A0)[B2], TP4 (CH0 B)[B2]
MODE	CW RECORDING
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	75% COLOR BAR
ADJ.	VR200[B6]

<STEP 1>

Set the spectrum analyzer as follows.

(REG 3)

REFERENCE LEVEL : 0dBm
 ATTEN : 10dB
 DIV (dB/DIV) : 10dB/div
 START FREQUENCY : 20MHz
 STOP FREQUENCY : 70MHz
 RES BW : 300kHz
 VIDEO BW : 10kHz
 SWEEP TIME : 30m sec
 TRIGGER : FREE RUN

<STEP 2>

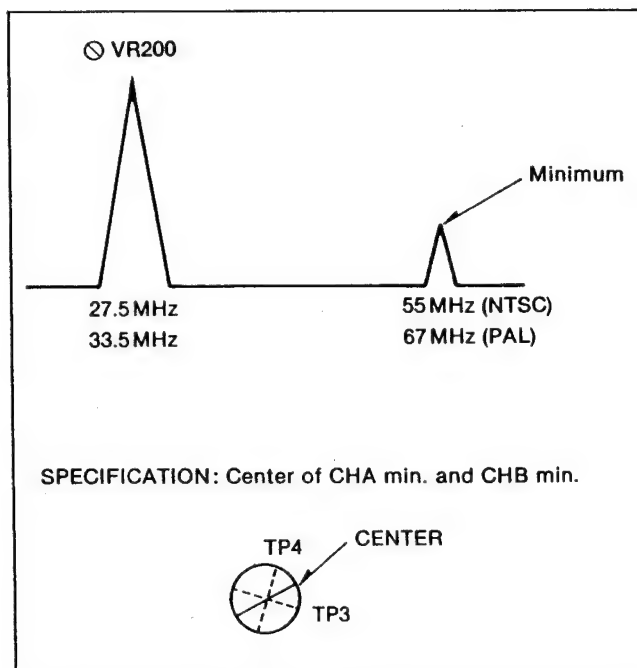
1. Insert a self recording tape to the VTR and set the VTR on Recording mode.
2. Set the Front Menu to CW Recording mode as follows.

TEST → RF → BS + F8 →
 (CURSOR CENTER) → ↓ ↓
 → →

3. Connect the spectrum analyzer probe to TP3.
4. SP USER MENU
Set the item "HEAD" to A from NOR
5. Adjust VR200 so that the 2ND Harmonics becomes minimum and memorize the VR200 position.
6. Connect the spectrum analyzer probe to TP4.
7. SP USER MENU

Set the item "HEAD" to B from A

8. Adjust VR200 so that the 2ND Harmonics becomes minimum and memorize the VR200 position.
9. Set the VR200 at center between item 5 and 8.
10. Press HOME key.



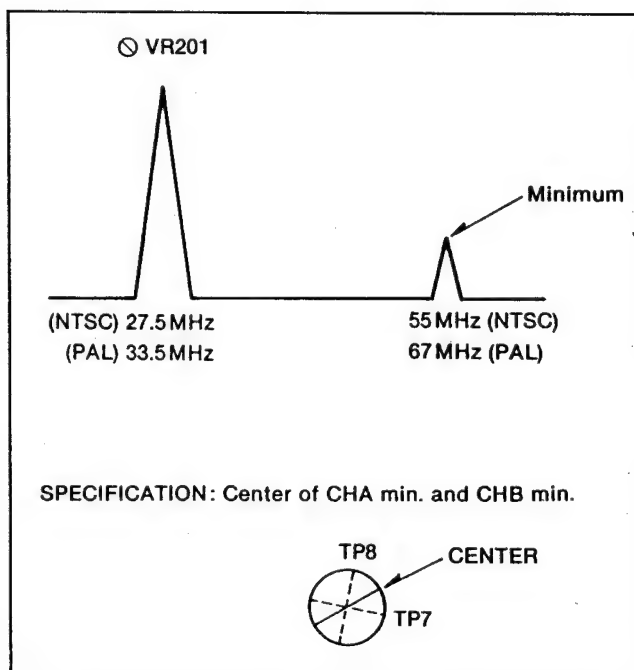
14-1-(2). REC 2nd HARMONICS DISTORTION ADJUSTMENT (2) (REC AMP)

SPEC	MINIMUM 2ND HARMONICS
TEST	TP7 (CH1 A)[B1], TP8 (CH1 B)[B1]
MODE	CW RECORDING
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	75% COLOR BAR
ADJ.	VR201[B6]

<STEP 1>

Set the spectrum analyzer as follows.
(REG 3)

REFERENCE LEVEL : 0dBm
ATTEN : 10dB
DIV (dB/DIV) : 10dB/div
START FREQUENCY : 20MHz
STOP FREQUENCY : 70MHz
RES BW : 300kHz
VIDEO BW : 10kHz
SWEEP TIME : 30m sec
TRIGGER : FREE RUM



<STEP 2>

1. Insert a self recording tape to the VTR and set the VTR on Recording mode.
2. Set the Front Menu to CW Recording mode as follows.
TEST → RF → BS + F8 →
(CURSOR CENTER) → ↓ ↓
→ →
3. Connect the spectrum analyzer probe to TP7.
4. SP USER MENU
Set the item "HEAD" to A from NOR
5. Adjust VR201 so that the 2ND Harmonics becomes minimum and memorize the VR201 position.
6. Connect the spectrum analyzer probe to TP8.
7. SP USER MENU
Set the item "HEAD" to B from A
8. Adjust VR201 so that the 2ND Harmonics becomes minimum and memorize the VR201 position.
9. Set the VR201 at center between item 5 and 8.
10. Press HOME key.

14-2. REC CURRENT and REC EQUALIZER ADJUSTMENT (CH0) (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8 (S1 BOARD), TP207 (REC AMP BOARD) → EXT IN
MODE	REC mode
TAPE	75% COLOR BAR ALIGNMENT TAPE SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (S MENU) VR2 (CH0 A FREQ), VR4 (CH0 B FREQ)

<STEP 1>

Set the spectrum analyzer as follows.
(REG 4)

REFERENCE LEVEL : -10.0dBm
ATTEN : 10dB
DIV (dB/DIV) : 5dB/div
START FREQUENCY : 0Hz
STOP FREQUENCY : 50MHz
RES BW : 1MHz
VIDEO BW : 3kHz
SWEEP TIME : 300m sec
TRIGGER : EXT(HEAD SW)

<STEP 2>

Set the VTR shuffling off, error correction off and error concealment off mode.

L2 SW51-2 (OFF), SW51-3 (OFF)
L3 SW1 (OFF), SW2 (OFF), SW3 (OFF),
SW4 (OFF)
L4 SW802 (OFF)

<STEP 3>

1. Connect the spectrum analyzer probe to TP8 on S1 Board.
2. Playback a Shuffling off 75% color bar alignment tape.

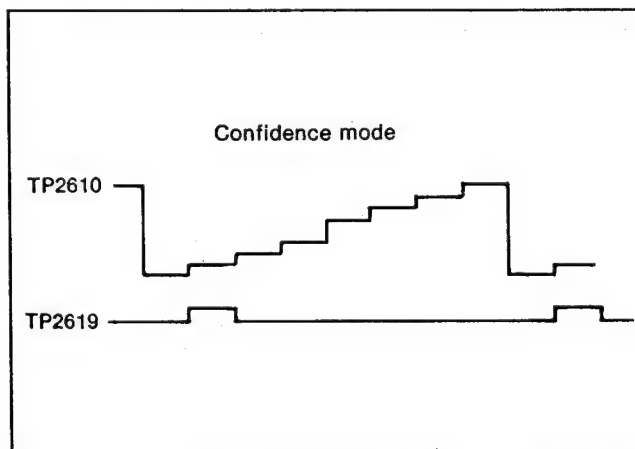
<STEP 4>

1. SCOPE CH1 : TP2610 (S4)
SCOPE CH2 : TP2619 (S4)
2. Set the machine condition as follows.
VIDEO OUT → SET UP → STATE → [] (CURSOR CENTER)
[→] → [→] → [→] (EDIT REC) → TAPE → MANUAL EDIT → INSERT

3. Set the VTR PLAY mode.

4. Confirm that the waveform is shown below and the envelope level on the front bar graph panel becomes maximum.

TEST → SERVO → AT → F4(CENTER) → EXIT → EXIT
→ RF → AT HEIGHT (F7) → BS+F8 → [] (CURSOR CENTER) → F+[←]
A and B Heads are selected by cursor key [←] [→].
If not, adjust Front Panel adjustment knob so that the these two conditions will be satisfied.



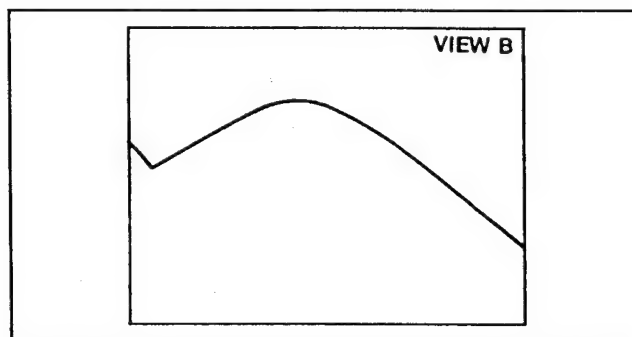
Note: This AT HEIGHT adjustment is tentative adjustment to get maximum envelope in correct AT Trace. Actual AT Adjustment must be done in AT (S4) Adjustment.

<STEP 5>

1. Memorize the frequency characteristics waveform to VIEW B of the spectrum analyzer.
2. Set the machine condition as follows.

MANUAL EDIT → INSERT (INSERT OFF mode).

Note: STEP 4 and 5 place the AT Heads in the confidence position, when in Playback mode. The frequency characteristics can then be memorized and compared to the Rec frequency characteristics.



<STEP 6>

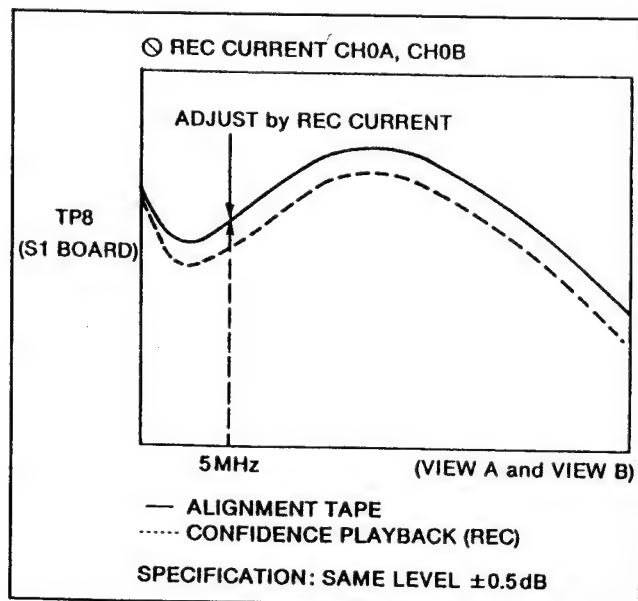
1. Eject the alignment tape and insert a self recording tape.
2. Connect the spectrum analyzer probe to TP8 on S1 Board.
3. Set the VTR in Rec mode.
4. Make sure that the AT Head height is correct position to get maximum envelope on CH0 display.
5. Set the FRONT MENU to REC CURRENT mode.

TEST → RF → F4(REC CURRENT) → BS+F8 → []
(CURSOR CENTER) → F+[←]
CH0 A, CH0 B, CH1 A, CH1 B Heads are selected by
cursor key [↑] [↓].

6. Confirm that envelope on the bar graph is still keeping maximum level. If not, back to AT-HEIGHT adjusting menu and readjust Front Panel adjusting knob to get maximum level of envelope.
7. Set spectrum analyzer to REG 5. (refer to set up chart).

<STEP 7>

Adjust the REC Current CH0 A and CH0 B so that the waveform level is same level with the alignment tape play level at 5MHz.

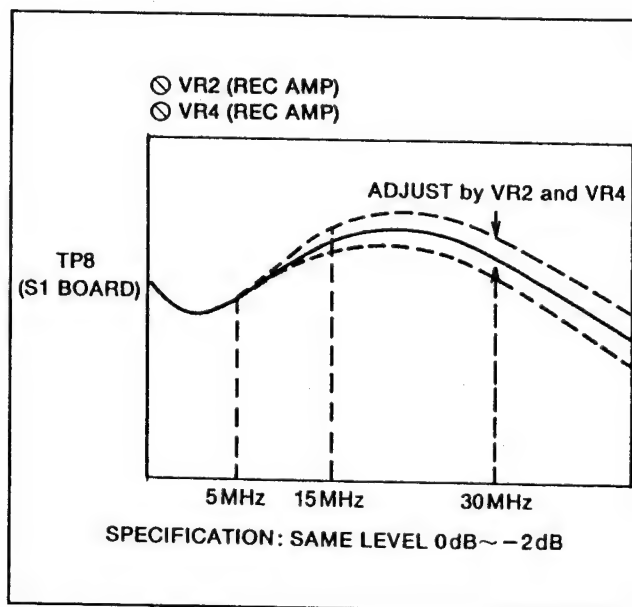


<STEP 8>

1. CH0B Rec Current Adjustment is same as CH0A which is described STEP 6- ~ STEP 7. (Just change the CH).

<STEP 9>

1. Adjust VR2 (CH0 A) and VR4 (CH0 B) so that the waveform level is same at 30MHZ as shown below and confirm that the error rate on the front panel is minimum.
2. If it is not, set the CH0 B to -128 by using adjustment VR on the front panel. And adjust VR2 (CH0 A) so that the error rate is minimum and same level.
3. Adjust VR4 (CH0 B) so that the error rate is minimum by using the same method above.

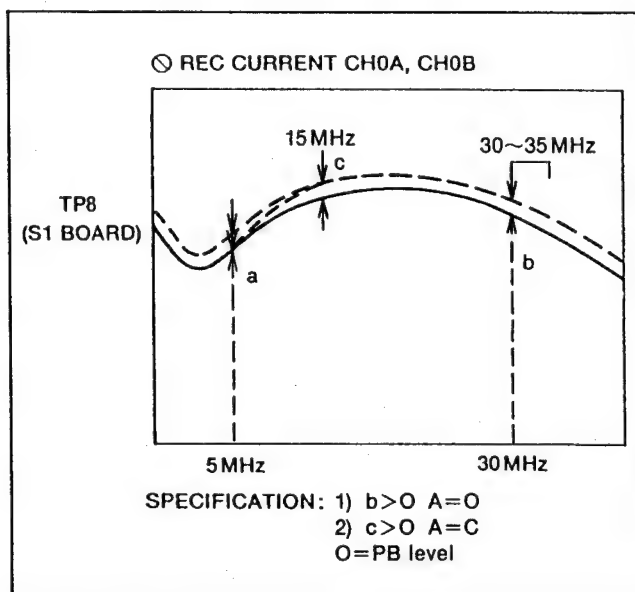


<STEP 10>

1. If level is increased at 30MHz to 35MHz, adjust REC CURRENT CH0 A and CH0 B so that the output level at 5MHz is same level. (A:0).
2. If the level is increased at 5MHz, adjust REC CURRENT CH0 A and CH0 B so that the output level at 5MHz is same increasing value. (a:c).

Caution : Adjustment point of VR2 and VR4 are as shown below.



**<STEP 11>**

1. Set the machine condition as follows.

VIDEO OUT → SET UP → STATE → [] (CURSOR CENTER)
 [→] → [→] → [→] (EDIT REC) → TAPE →
 MANUAL EDIT → INSERT

2. Set the VTR PLAY mode.
3. Confirm that the waveform level is same and error rate is minimum.

<STEP 12>

Set the AT HEIGHT Front Menu to all 0.

14-3. REC CURRENT and REC EQUALIZER ADJUSTMENT (CH1) (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8(S2 BOARD), TP207(S2 BOARD) → EXT IN
MODE	VAR × 1
TAPE	75% COLOR BAR ALIGNMENT TAPE SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	SHUFFLING OFF 75% COLOR BARALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (SP MENU) VR7 (CH1 A FREQ), VR9 (CH1 B FREQ)

<STEP 1>

Set the spectrum analyzer as follows.

(REG 4)

REFERENCE LEVEL	: -10.0dBm
ATTEN	: 10dB
DIV (dB/DIV)	: 5dB/div
START FREQUENCY	: 0Hz
STOP FREQUENCY	: 50MHz
RES BW	: 1MHz
VIDEO BW	: 3kHz
SWEEP TIME	: 300m sec
TRIGGER	: EXT (HEAD SW)

<STEP 2>

Set the VTR shuffling off, error correction off and error concealment off mode.

L2 SW51-2 (OFF), SW51-3 (OFF)
 L3 SW1 (OFF), SW2 (OFF), SW3 (OFF),
 SW4 (OFF)
 L4 SW802 (OFF)

<STEP 3>

1. Connect the spectrum analyzer probe to TP8 on S2 Board.
2. Playback a Shuffling off 75% color bar alignment tape.

<STEP 4>

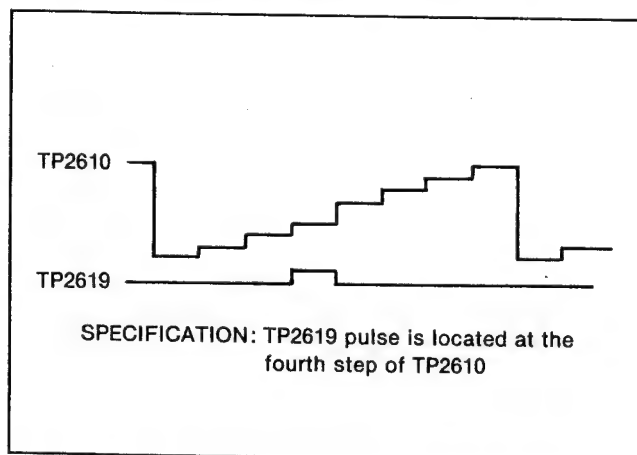
1. SCOPE CH1 : TP2610 (S4)
 SCOPE CH2 : TP2619 (S4)
2. Set the machine condition as follows.

VIDEO OUT → SET UP → STATE → [] (CURSOR CENTER)
 [→] → [→] → [→] (EDIT REC) →
 TAPE → MANUAL EDIT → INSERT

3. Set the VTR PLAY mode.
4. Confirm that the waveform is shown below and the envelope level on the front panel bar graph becomes maximum.
If not, adjust Front Panel adjustment knob so that the these two conditions will be satisfied.

TEST → SERVO → AT → F4(CENTER) → EXIT → EXIT → RF → AT HEIGHT → BS+F8 → [] (CURSOR CENTER) → F+[-]

A and B Heads are selected by cursor key [←] [→].

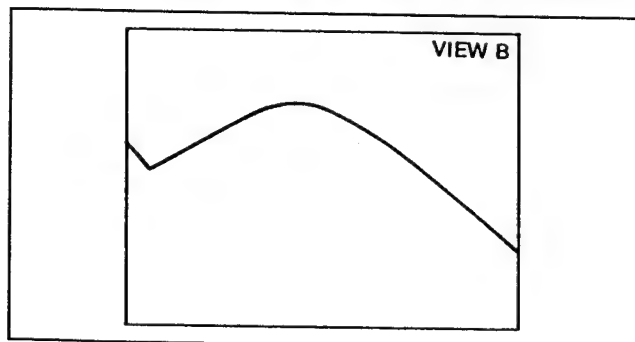


Note: This AT HEIGHT adjustment is tentative adjustment to get maximum envelope in correct AT Trace. Actual AT Adjustment must be done in AT (S4) Adjustment.

<STEP 5>

1. Memorize the frequency characteristics waveform to VIEW B of the spectrum analyzer.
2. Set the machine condition as follows.
MANUAL EDIT → INSERT (INSERT OFF mode).

Note: STEP 4 and 5 is place the AT Heads in the confidence position, when in Playback mode. The frequency characteristics can be memorized and compared to the Rec frequency characteristics.



<STEP 6>

1. Eject the alignment tape and insert a self recording tape.
2. Connect the spectrum analyzer probe to TP8 on S2 Board.
3. Set the VTR in Rec mode.
4. Make sure that the AT Head height is correct position. to get maximum envelope on CH1 display.
5. Set the FRONT MENU to REC CURRENT mode.

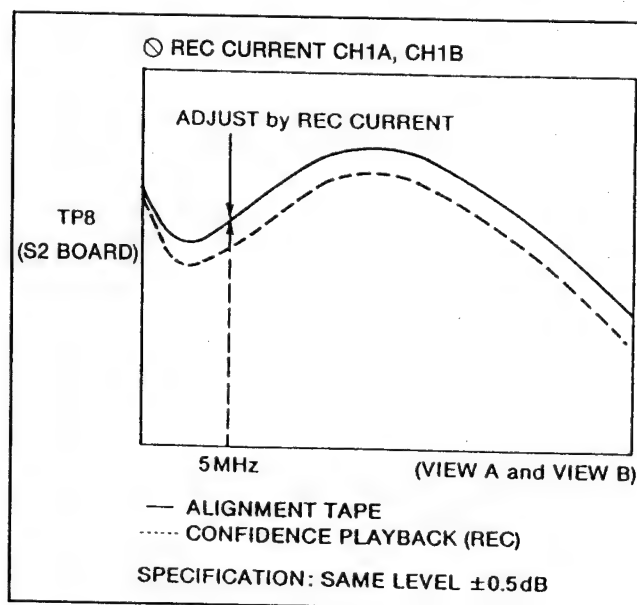
TEST → RF → F4(REC CURRENT) → BS+F8 → [] (CURSOR CENTER) → F+[-]

CH0 A, CH0 B, CH1 A, CH1 B Heads are selected by cursor key [↑] [↓].

6. Confirm that envelope on the bar graph is still keeping maximum level. If not, back to AT-HEIGHT adjusting menu and readjust Front Panel adjusting knob to get maximum level of envelope.
7. Set spectrum analyzer to REG 5. (refer to set up chart).

<STEP 7>

Adjust the REC Current CH1 A and CH1 B so that the waveform level is same level with the alignment tape play level at 5MHz.

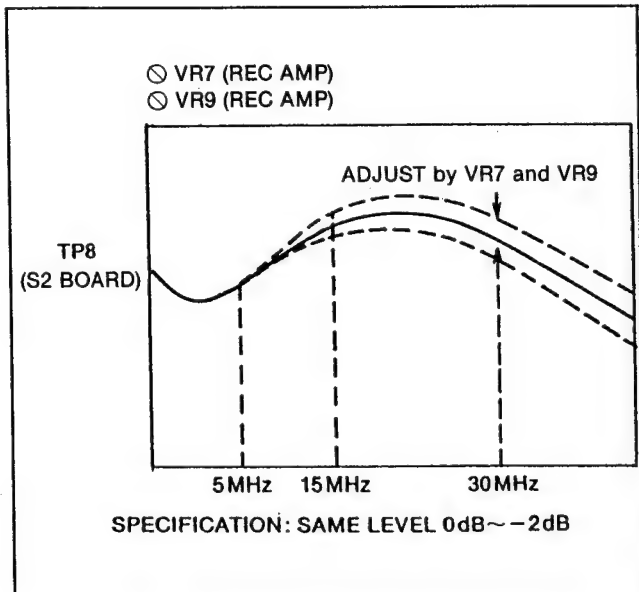


<STEP 8>

1. CH1B Rec Current Adjustment is same as CH1A which is described STEP 6-3 ~ STEP 7 (Just change the CH).

<STEP 9>

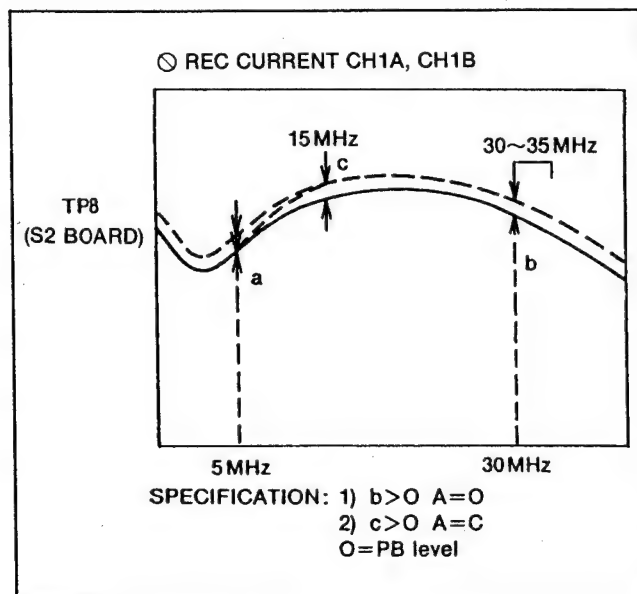
1. Adjust VR7 (CH1 A) and VR9 (CH1 B) so that the waveform level is same at 30MHz as shown below and confirm that the error rate on the front panel is minimum.
2. If it is not, set the CH1 B to -128 by using adjustment VR on the front panel. And adjust VR7 (CH1 A) so that the error rate is minimum and same level.
3. Adjust VR9 (CH1 B) so that the error rate is minimum by using the same method above.



<STEP 10>

1. If level is increased at 30MHz to 35MHz, adjust REC CURRENT CH1 A and CH1 B so that the output level at 5MHz is same level. (A:0).
2. If the level is increased at 5MHz, adjust REC CURRENT CH1 A and CH1 B so that the output level at 5MHz is same increasing value. (a:c).

Caution : Adjust point of VR7 and VR9 are as shown below.



<STEP 11>

1. Set the machine condition as follows.

VIDEO OUT → SET UP → STATE → [] (CURSOR CENTER)
[→] → [→] → [→] (EDIT REC) → TAPE →
MANUAL EDIT → INSERT

2. Set the VTR PLAY mode.
3. Confirm that the waveform level is same and error rate is minimum.

<STEP 12>

Set the AT HEIGHT Front Menu to all 0.

<STEP 13>

1. Save the REC CURRENT DATA as follows TEST MENU.

BS + F8 → F9 (Select USER) → F + F11 (SAVE)

Note: When save the data, REC CURRENT data display will be disappeared.

ADJUSTMENT KNOW HOW (INFORMATION)

1. Insert a cassette and place the unit in recording mode.
2. Set the machine condition as follows.

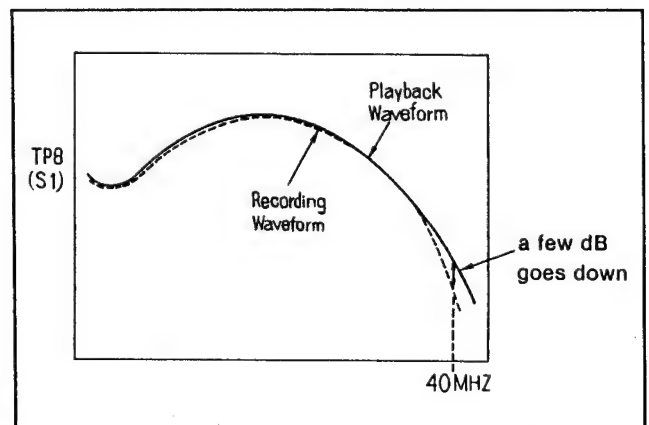
TEST → RF → REC CURR → [] (CURSOR CENTER) → [→] → (REC CURR).

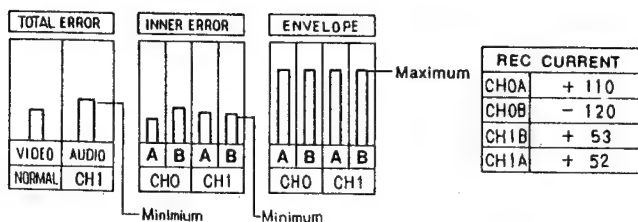
CH0 A, CH0 B CH1 A or CH1 B Heads are selected by cursor key [↑] [↓].

3. Adjust each CH by using the adjustment VR on the front panel so that the output envelope is maximum and minimum error on the display.

* In confidence mode, if adjust CH0 A, change the CH0 B envelope output. (CHA recording, CHB playback in confidence mode).

4. Adjust VR2, VR4, VR7 and VR9 on the REC AMP board so that the error rate is minimum.
5. After this adjustment check the frequency characteristics waveforms by using the spectrum analyzer. Refer to the item 14-2 and 14-3.
6. This specification is minimum error rate. (Inner Error rate is less than 4 on the display bar.)
7. If out of specification check the frequency characteristic waveform by using the spectrum analyzer. Connect the spectrum analyzer to TP8 on the S1 board and play back the alignment tape (1) and memorize the frequency characteristic waveform.
8. After memorize, place the unit in the recording mode.
9. If output waveform is same as the playback waveform, readjust the VR612 and VR613 so that the output level goes down a few dB level around 40MHz portion and minimum error rate as shown in Figure.





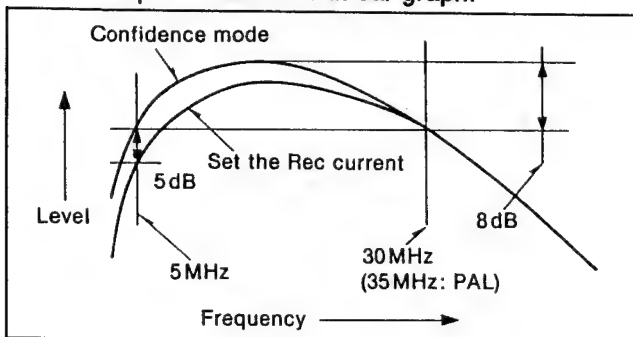
FINAL CONFIRMATION

SPEC	REFER TO FIGURE
TEST	TP8(S1,S2 BOARD), TP207(REC AMP BOARD) → EXT IN
MODE	REC mode
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	75% COLOR BAR SHUFFLING OFF ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (SP MENU) VR2, VR4, VR7, VR9

1. Set the spectrum analyzer as shown item 14-2.
2. Connect the spectrum analyzer to TP8.
3. Connect the EXT input of spectrum analyzer to TP207.
4. Place the unit in the recording mode and memories the frequency characteristics waveform to VIEW B of the spectrum analyzer.
5. Set the Rec current of front panel so that the output spectrum of 5MHz goes down to -5dB.
6. Confirm that the output spectrum as shown in figure.
7. If it is not, readjust the Rec current of front panel and VR2, VR4, VR7 and VR9.

MIX point of Both Spectrum = 30MHz ± 3MHz (NTSC)
35MHz → 3MHz (PAL)

8. Confirm that the error rate is minimum and envelope is maximum at bar graph.



14-4. RF2 ENVELOPE DETECTION ADJUSTMENT

SPEC	MAX. ENVELOPE ON FRONT METER
TEST	FRONT METER OF TEST RF MENU
MODE	PLAY
TAPE	COLOR BAR SECTION OF ALIGNMENT TAPE
M.EQ	400MHz OSCILLOSCOPE
INPUT	
ADJ.	VR10[B3](CH1 OFF), VR12[B3](CH1 GAIN) VR5 [F1], VR11 [G1]

<STEP 1>

1. Set VR11 to center position
2. SCOPE CH1 : TP1
CH2 : TP207 for Trigger
3. Adjust VR5 so that the DC voltage is 1.5V ± 0.1V.

<STEP 2>

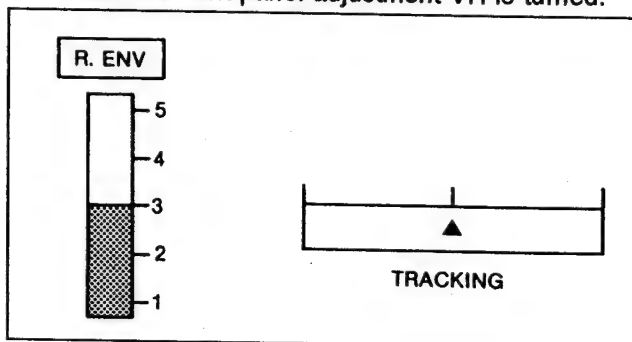
1. Turn the VR10 fully colockwise.
2. Playback the alignment tape color bar portion.
3. Set the tracking FIX mode.

TEST → RF → TRACKING → FIX

4. Adjust VR12 so that the envelope meter shows 3.0 as shown in figure.
5. Set the tracking variable mode.

TEST → RF → TRACKING → VAR

Confirm the envelope meter value is changed when the front panel adjustment VR is turned.

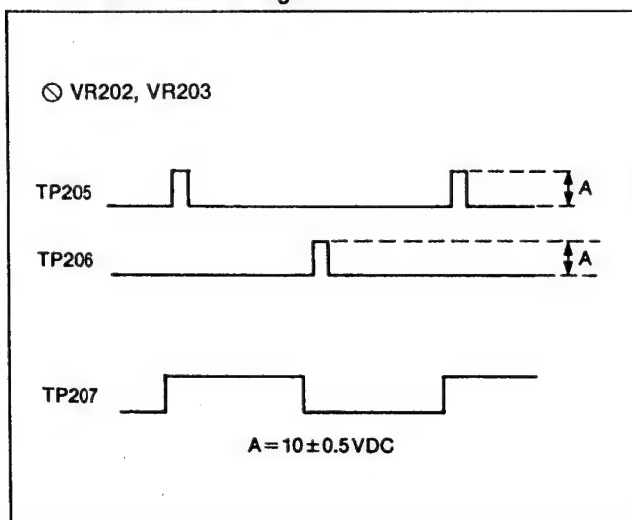


14.5. ROTARY ERASE ADJUSTMENT (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8 (S1 and S2)[E2], TP205[J5], TP206[K5],
MODE	AUDIO INSERT → VAR X 1
TAPE	BLANK TAPE
M.EQ	400MHz OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR202[O3], VR203[N1]

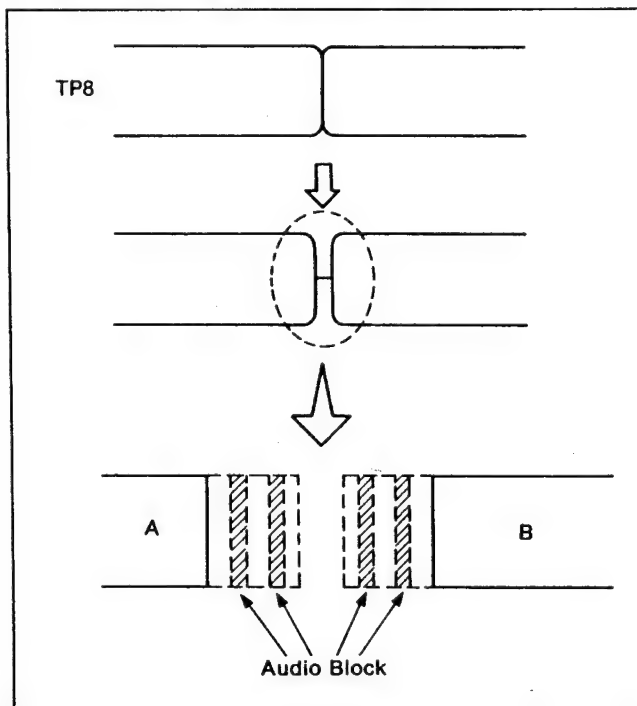
<STEP 1>

- SCOPE CH2 : TP205
CH3 : TP206
CH4 : TP207
- SCOPE TRIGGER : CH4
- Disconnect the P504 and P511.
- Set the "AUDIO INSERT" mode on MENU condition.
- Place the unit in the Audio Insert mode. (PLAY → REC)
- Adjust VR202 so that the DC voltage is $10 \pm 0.5V$ DC as shown in Figure.
- Adjust VR203 so that the DC voltage is $10 \pm 0.5V$ DC as shown in Figure.



<STEP 3>

- SCOPE CH1 : TP8/TPG5 (S2 board)
CH4 : TP207
- Confirm that the envelope is within the above specification.
- Re-connect the P504 and P511.



<STEP 2>

- SCOPE CH1 : TP8/TPG5 (S1 board)
CH4 : TP207
- Playback an after adjustment recorded portion on VAR X 1 mode.
- Confirm that the Audio Block of envelope is erased as shown in Figure.

15. HEAD AMP REGULATOR BOARD

15-1. DC OUTPUT ADJUSTMENT (H.A REGURATOR)

SPEC	SV DC \pm 0.1V DC
TEST	TP5
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR
ADJ.	VR2

<STEP 1>

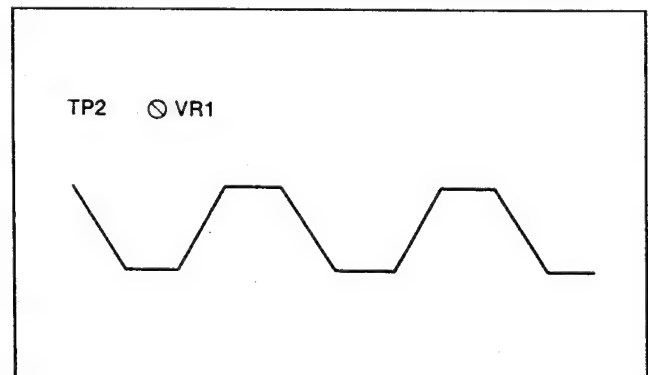
1. OSCILLOSCOPE : TP5
2. Adjust VR2 so that the adjust DC is 8V DC \pm 0.1V DC.

15-2. WAVEFORM SHADER ADJUSTMENT (H.A REGURATOR)

SPEC	AS SHOWN FIGURE
TEST	TP2
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR
ADJ.	VR1

<STEP 1>

1. OSCILLOSCOPE : TP2
2. Adjust VR1 so that the output waveform is as shown below.



16. VIDEO/AUDIO REC (L2) BOARD

16-1. PLL (1) ADJUSTMENT

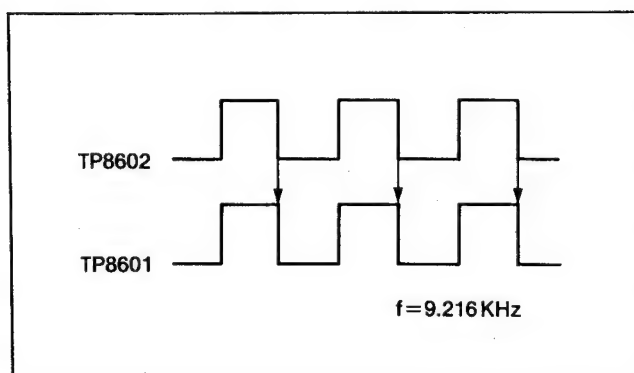
SPEC	AS SHOWN FIGURE
TEST	TP8602, TP8601
MODE	PITCH CONTROL $\pm 15\%$
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8601[B6]

<STEP 1>

- SCOPE CH1 : TP8602 (TRIGGER)
CH2 : TP8601
- MENU CONDITION
HOME MENU SET UP → PRPL ON
Set the Program play to $\pm 15\%$
- Confirm that the waveforms are locked as shown in figure.

<STEP 2>

- If it is not, adjust VR8601 so that the waveform are locked.



16-2. PLL (2) ADJUSTMENT

SPEC	AS SHOWN FIGURE
TEST	TP8605, TP8604
MODE	PITCH CONTROL $\pm 15\%$
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8602[D5]

<STEP 1>

- SCOPE CH1 : TP8605 (TRIGGER)
CH2 : TP8604
- MENU CONDITION

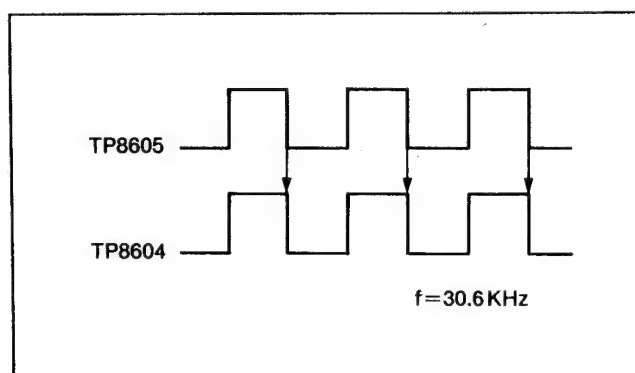
HOME MENU SET UP → PRPL ON

Set the Program play to $\pm 15\%$

- Confirm that the waveforms are locked as shown in figure.

<STEP 2>

- If it is not, adjust VR8602 so that the waveform are locked.



16-3. PLL (3) ADJUSTMENT

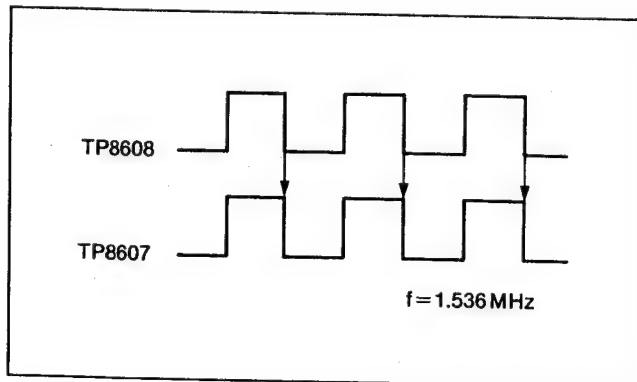
SPEC	AS SHOWN FIGURE
TEST	TP8608, TP8607
MODE	PITCH CONTROL $\pm 15\%$
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8603[D4]

<STEP 1>

- SCOPE CH1 : TP8608 (TRIGGER)
CH2 : TP8607
- MENU CONDITION
HOME MENU SET UP \rightarrow PRPL ON
Set the Program play to $\pm 15\%$
- Confirm that the waveforms are locked as shown in figure.

<STEP 2>

- If it is not, adjust VR8603 so that the waveform are locked.



17. SYSTEM CONTROL (S7) BOARD

SPEC	$2.00\text{V} \pm 0.01\text{V}$
TEST	TP1[B3]
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1[A4]

<STEP 1>

- MENU CONDITION
TEST \rightarrow RF \rightarrow REC CNT \rightarrow (cursor center)
- Memorize the REC current value and adjust the REC current value are +127 on the every channels.

<STEP 2>

- SCOPE CH1 : TP1
- Adjust VR1 so that the output level is $2.00\text{V} \pm 0.01\text{VDC}$.
- Reset the REC current value to original position.

SPECTRUM ANALYZER SETUP (MODEL HP8591A)

1. SETUP -- REG 1

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) CENTER FREQUENCY	27.5MHz
(5) FREQUENCY SPAN	10MHz
(6) RES BW	100kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	30

2. SETUP -- REG 2

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) CENTER FREQUENCY	27.5MHz
(5) FREQUENCY SPAN	10MHz
(6) RES BW	100kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	30

3. SETUP -- REG 3

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) START FREQUENCY	20MHz
(5) STOP FREQUENCY	70MHz
(6) RES BW	300kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIMER	30msec
(9) TRIGGER	FREE RUM

4. SETUP -- REG 4

ITEM	PARAMETER
(1) REF LEVEL	-10dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	0MHz
(5) STOP FREQUENCY	50MHz
(6) RES BW	1MHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	10

5. SETUP -- REG 5

ITEM	PARAMETER
(1) REF LEVEL	-20dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	0MHz
(5) STOP FREQUENCY	50MHz
(6) RES BW	1kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)

6. SETUP -- REG 6

ITEM	PARAMETER
(1) REF LEVEL	-15dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	27.5MHz
(5) STOP FREQUENCY	0MHz
(6) RES BW	1MHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	200msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	5

Service Manual

*Abbreviations
and
IC Informations*

Panasonic
Broadcast Systems

P.C.BOARD PIN ABBREVIATIONS

CONTENTS

P001 (L1)	-----	4-A- 1
P002 (L1)	-----	4-A- 1
P003 (L2)	-----	4-A- 4
P004 (L2)	-----	4-A- 4
P005 (L3)	-----	4-A- 7
P006 (L3)	-----	4-A- 7
P007 (L4)	-----	4-A-10
P008 (L4)	-----	4-A-10
P201 (S1)	-----	4-A-13
P202 (S1)	-----	4-A-13
P203 (S2)	-----	4-A-16
P204 (S2)	-----	4-A-16
P205 (S3)	-----	4-A-19
P206 (S3)	-----	4-A-19
P207 (S4)	-----	4-A-22
P208 (S4)	-----	4-A-22
P209 (S5)	-----	4-A-25
P210 (S5)	-----	4-A-25
P211 (S6)	-----	4-A-28
P212 (S6)	-----	4-A-28
P213 (S7)	-----	4-A-31
P214 (S7)	-----	4-A-31
P215 (S8)	-----	4-A-34
P216 (S8)	-----	4-A-34
P217 (S9)	-----	4-A-37
P218 (S9)	-----	4-A-37

P.C.BOARD PIN ABBREVIATIONS

P001 A (L1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	+8V (UN)		+8V (UNREGULATED)	
6	-8V (UN)		-8V (UNREGULATED)	
7	+15V (UN)		+15V (UNREGULATED)	
8	-15V (UN)		-15V (UNREGULATED)	
9	GND (A)			
10	CH1 IN G		CH1 LINE IN GND	
11	CH2 IN G		CH2 LINE IN GND	
12	CH3 IN G		CH3 LINE IN GND	
13	CH4 IN G		CH4 LINE IN GND	
14	GND (A)			
15	CH1 OUT	O	CH1 LINE OUT	
16	GND (A)		CH1 LINE OUT GND	
17	CH4 OUT	O	CH4 LINE OUT	
18	GND (A)		CH4 LINE OUT GND	
19	GND (A)			
20				
21				
22				
23				
24	AV AB 13	I	AV ADDRESS BUS	
25	AV AB 10	I	AV ADDRESS BUS	
26	AV AD 7	I	AV ADDRESS DATA BUS	
27	AV AD 4	I	AV ADDRESS DATA BUS	
28	AV AD 1	I	AV ADDRESS DATA BUS	
29	AV RD	I	AV READ	
30				
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P002 A' (L1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DSD 1	I	SERIAL DATA INPUT CH1/CH2	
3				
4	ASD 1	O	SERIAL DATA OUTPUT CH1/CH2	
5				
6				
7				
8				
9				
10				
11	AV DATA 5	I	VIDEO DAC INPUT	
12	AV DATA 2	I	VIDEO DAC INPUT	
13	AV DATA -1	I	VIDEO DAC INPUT	
14	AV CLK	I	VIDEO DAC CLK IN	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	RET V	I	INCOME VIDEO INPUT	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	V1 OUT	O	VIDEO 1 OUTPUT	
19	GND (A)		GND (ANALOG CIRCUIT)	
20	WFM OUT	O	WFM OUTPUT	
21	GND (A)		GND (ANALOG CIRCUIT)	
22	GND (A)			
23				
24				
25				
26				
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P001 B (L1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	+8V (UN)		+8V (UNREGULATED)	
6	-8V (UN)		-8V (UNREGULATED)	
7	+15V (UN)		+15V (UNRAGURETED)	
8	-15V (UN)		-15V (UNREGULATED)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	CH1 IN C	I	CH1 LINE IN COLD	
11	CH2 IN C	I	CH2 LINE IN COLD	
12	CH3 IN C	I	CH3 LINE IN COLD	
13	CH4 IN C	I	CH4 LINE IN COLD	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	CH2 OUT	O	CH2 LINE OUT	
16	GND (A)		CH2 LINE OUT GND	
17	MOL OUT	O	MONITOR L OUT	
18	GND (A)		MONITOR L OUT GND	
19	GND (A)		GND (ANALOG CIRCUIT)	
20				
21	AMCK	I	ANALOG AUDIO MASTER CLOCK	
22	AMCK L	I	ANALOG AUDIO MASTER CLOCK LOW	
23	ABCK	I	ANALOG AUDIO BIT CLOCK	
24	AV AB 14	I	AV ADDRESS BUS	
25	AV AB 11	I	AV ADDRESS BUS	
26	AV AB 8	I	AV ADDRESS BUS	
27	AV AD 5	I	AV ADDRESS DATA BUS	
28	AV AD 2	I	AV ADDRESS DATA BUS	
29	AV ALE	I	AV ADDRESS LOAD ENABLE	
30	AV RESET	I	AV RESET	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P002 B' (L1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3	DSD L	I	SERIAL DATA INPUT L/R	
4				
5				
6				
7				
8				
9				
10				
11	AV DATA 6	I	VIDEO DAC INPUT	
12	AV DATA 3	I	VIDEO DAC INPUT	
13	AV DATA 0	I	VIDEO DAC INPUT	
14	AV CLK L	I	VIDEO DAC CLK INPUT	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	RF IN		USING FOR RF WFM	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	V2 OUT		VIDEO 2 OUTPUT	
19	GND (A)		GND (ANALOG CIRCUIT)	
20	CHAR DAT		CHARACTER DATA FOR SUPER	
21	GND (A)		GND (ANALOG CIRCUIT)	
22	GND (A)		GND (ANALOG CIRCUIT)	
23				
24				
25				
26				
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P001 C (L1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	+8V (UN)		+8V (UNREGULATED)	
6	-8V (UN)		-8V (UNREGULATED)	
7	+15V (UN)		+15V (UNREGULATED)	
8	-15V (UN)		-15V (UNREGULATED)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	CH1 IN H	I	CH1 LINE IN HOT	
11	CH2 IN H	I	CH2 LINE IN HOT	
12	CH3 IN H	I	CH3 LINE IN HOT	
13	CH4 IN H	I	CH4 LINE IN HOT	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	CH3 OUT	O	CH3 LINE OUT	
16	GND (A)		CH3 LINE OUT GND	
17	MOR OUT	O	MONITOR R OUT	
18	GND (A)		MONITOR R OUT GND	
19	GND (A)		GND (ANALOG CIRCUIT)	
20				
21				
22				
23	AWCK	I	ANALOG AUDIO WORD CLOCK	
24	AV AB 15	I	AV ADDRESS BUS	
25	AV AB 12	I	AV ADDRESS BUS	
26	AV AB 9	I	AV ADDRESS BUS	
27	AV AD 6	I	AV ADDRESS DATA BUS	
28	AV AD 3	I	AV ADDRESS DATA BUS	
29	AV AD 0	I	AV ADDRESS DATA BUS	
30	AV WR	I	AV WRITE	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P002 C' (L1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DSD 3	I	SERIAL DATA INPUT CH3/CH4	
3				
4	ASD 3	O	SERIAL DATA OUTPUT CH3/CH4	
5				
6				
7				
8				
9	SYNC BLK		SYNC BLANKING	
10	BURST FL		CLAMP PULSE (BURST FLAG)	
11	AV DATA 7	I	VIDEO DAC INPUT	
12	AV DATA 4	I	VIDEO DAC INPUT	
13	AV DATA 1	I	VIDEO DAC INPUT	
14	AV DATA -2	I	VIDEO DAC INPUT	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	CTL IN		USING FOR CTL WFM	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	V3 OUT		VIDEO 3 OUTPUT	
19	GND (A)		GND (ANALOG CIRCUIT)	
20	CHAR GAT		CHARACTER GATE FOR SUPER	
21	GND (A)		GND (ANALOG CIRCUIT)	
22	GND (A)		GND (ANALOG CIRCUIT)	
23				
24				
25				
26				
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P003 A (L2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	DIF CK	I	DIGITAL INTERFACE CLOCK (POS)	
6	DIF CK (NEG)	I	DIGITAL INTERFACE CLOCK (NEG)	
7	INCOM HA	O	INCOME H RESET	
8	INCOM FNO	O	INCOME FIELD NO	
9	BYP1 4FSC		BYPASS 1 4FSC (POS)	
10	BYP1 4FSC (NEG)		BYPASS 1 4FSC (NEG)	
11	REF H0		REF H OUT	
12	REF CS	I	REF COMPOSITE SYNC	
13	H RST		H RESET	
14	INCOM CS		INCOME COMPOSITE SYNC	
15	BYP2 4FSC		BYPASS 2 4 FSC	
16	BYP2 4FSC (NEG)		BYBASS 2 4 FSC LOW	
17	AU DATA IN 5	I	AUDIO REC DATA	
18	AU DATA IN 2	I	AUDIO REC DATA	
19	AU DATA GND		AUDIO REC DATA GND	
20				
21				
22				
23	FSD	I	DIGITAL IF SAMDLING CLOCK	
24	AV AB 13	I	AV ADDRESS BUS	
25	AV AB 10	I	AV ADDRESS BUS	
26	AV AD 7	I	AV ADDRESS DATA BUS	
27	AV AD 4	I	AV ADDRESS DATA BUS	
28	AV AD 1	I	AV ADDRESS DATA BUS	
29	AV RD	I	AV READ	
30	ST 0	I	STATUS DATA 0	
31	ST 1	I	STATUS DATA 1	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P004 A' (L2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DV DATA IN 5	I	DIGITAL VIDEO DATA IN	
3	DV DATA IN 2	I	DIGITAL VIDEO DATA IN	
4	DV DATA IN -1	I	DIGITAL VIDEO DATA IN	
5	DV CLK I	I	DIGITAL VIDEO CLOCK	
6	NC.			
7	GND (D)		GND (DIGITAL CIRCUIT)	
8	AV CS		ANALOG VIDEO COMPOSITE SYNC POS	
9	AV CS (NEG)		ANALOG VIDEO COMPOSITE SYNC NEG	
10	AV DATA IN 5	I	ANALOG VIDEO DATA IN (POS)	
11	AV DATA IN 5 (NEG)	I	ANALOG VIDEO DATA IN (NEG)	
12	AV DATA IN 2	I	ANALOG VIDEO DATA IN (POS)	
13	AV DATA IN 2 (NEG)	I	ANALOG VIDEO DATA IN (NEG)	
14	AV CLK I	I	ANALOG VIDEO CLOCK (POS)	
15	AV CLK I (NEG)	I	ANALOG VIDEO CLOCK (NEG)	
16	AV SC	I	ANALOG VIDEO SUB CARRIER (POS)	
17	AV SC (NEG)	I	ANALOG VIDEO SUB CARRIER (NEG)	
18	AV HO		AV H OUT (POS)	
19	AV HO (NEG)		AV H OUT (NEG)	
20	CH0 REC D	O	CH0 REC DATA (POS)	
21	CH0 REC D (NEG)	O	CH0 REC DATA (NEG)	
22	CH0 REC D GND		CH0 REC DATA GND	
23	BYP 9	O	BYPASS 9	
24	BYP 6	O	BYPASS 9	
25	BYP 3	O	BYPASS 9	
26	BYP 0	O	BYPASS 9	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P003 B (L2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)			
3	-12V (A)			
4	GND (A)			
5	MCK	O	AUDIO MASTER CLOCK (POS)	
6	MCK (NEG)	O	AUDIO MASTER CLOCK (NEG)	
7	INCOM REC SW	I	INCOME REC SWITCH	
8	INCOM FN 1	O	INCOME FIELD NO.1	
9	PCON CLK		PITCH CONTROL CLOCK	
10	PCON CLK GND		PITCH CONTROL CLOCK	
11	REF FRM		REFERENCE FRAME	
12	REF VS	I	REFERENCE VERTICAL SYNC	
13	FSA	O	AUDIO SAMPLING CLOCK	
14	INCOM LALT	I	INCOME LINE ALTERNATE	
15	BYP2 2FSC	O	BYPASS 2 2FSC (POS)	
16	BYP2 2FSC (NEG)	O	BYPASS 2 2FSC (NEG)	
17	AU DATA IN 6	I	AUDIO REC DATA	
18	AU DATA IN 3	I	AUDIO REC DATA	
19	AUDATA IN 0	I	AUDIO REC DATA	
20	DBCK	O	AUDIO MASTER CLOCK	
21	AMCK	O	ANALOG AUDIO MASTER CLOCK (POS)	
22	AMCK (NEG)	O	ANALOG AUDIO MASTER CLOCK (NEG)	
23	ABCK	O	ANALOG AUDIO BIT CLOCK	
24	AV AB 14	I	AV ADDRESS BUS	
25	AV AB 11	I	AV ADDRESS BUS	
26	AV AB 8	I	AV ADDRESS BUS	
27	AV AD 5	I	AV ADDRESS DATA BUS	
28	AV AD 2	I	AV ADDRESS DATA BUS	
29	AV ALE	I	AV ADDRESS LOAD ENABLE	
30	AV RESET	I	AV RESET	
31	ST 2	I	STATUS DATA 2	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P004 B' (L2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DV DATA IN 6	I	DIGITAL VIDEO DATA IN 6	
3	DV DATA IN 3	I	DIGITAL VIDEO DATA IN 3	
4	DV DATA IN 0	I	DIGITAL VIDEO DATA IN 0	
5	DV CLK I L	I	DIGITAL VIDEO CLK L	
6	REC COMP SYNC			
7	REC V SYNC			
8	REC H SW			
9	REC H SW GND			
10	AV DATA IN 6	I	ANALOG VIDEO DATA IN 6	
11	AV DATA IN 6 (NEG)	I	ANALOG VIDEO DATA IN 6 (NEG)	
12	AV DATA IN 3	I	ANALOG VIDEO DATA IN 3	
13	AV DATA IN 3 (NEG)	I	ANALOG VIDEO DATA IN 3 (NEG)	
14	AV DATA IN 0	I	ANALOG VIDEO DATA IN 0	
15	AV DATA IN 0 (NEG)	I	ANALOG VIDEO DATA IN 0 (NEG)	
16	AV VS		ANALOG VIDEO V SYNC	
17	AV FRM		ANALOG VIDEO FRAME	
18	FLY ERASE		FLYING ERASE	
19	FV/2		FRAME PULSE	
20	CH1 REC D	O	CH1 REC DATA	
21	CH1 REC D (NEG)	O	CH1 REC DATA LOW	
22	CH1 REC D GND			
23	BYP 10	O	BYPASS 10	
24	BYP 7	O	BYPASS 7	
25	BYP 4	O	BYPASS 4	
26	BYP 1	O	BYPASS 1	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P003 C (L2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)			
2	+12V (A)			
3	-12V (A)			
4	GND (A)			
5	PB RST	I	PLAYBACK RESET	
6	PB FLD	I	PLAYBACK FIELD	
7	PB 5F	I	PLAYBACK LEAP FIELD	
8	INCOM FN 2	O	INCOME FIELD NO.2	
9	REC FNO DL		REC FIELD NO.Ø DELAY	
10	FN Ø		REC FIELD NO.Ø	
11	REC CF		REC COLOR FRAMING	
12	REF CLK	I	REFERENCE CLOCK	
13	REF CLK (NEG)	I	REFERENCE CLOCK (NEG)	
14	INCOM SC		INCOME SUB CARRIER	
15	BYP3 WCK	O	BYPASS 3 WRITE CLOCK	
16	BYP3 WCK (NEG)	O	BYPASS 3 WRITE CLOCK LOW	
17	AU DATA IN 7	I	AUDIO DATA IN	
18	AU DATA IN 4	I	AUDIO DATA IN	
19	AU DATA IN 1	I	AUDIO DATA IN	
20	DBCK L	O	AUDIO MASTER CLOCK LOW	
21	AWCK	O	ANALOG AUDIO WORD CLOCK	
22	FS 128	O	FS* 128	
23	SEL REC SW		SELECT REC SWITCH	
24	AV AB 15	I	AV ADDRESS BUS	
25	AV AB 12	I	AV ADDRESS BUS	
26	AV AB 9	I	AV ADDRESS BUS	
27	AV AD 6	I	AV ADDRESS DATA BUS	
28	AV AD 3	I	AV ADDRESS DATA BUS	
29	AV AD 0	I	AV ADDRESS DATA BUS	
30	AV WR	I	AV WRITE	
31	ST 3	I	STATUS DATA 3	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P004 C' (L2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DV DATA IN 7	I	DIGITAL VIDEO DATA IN 7	
3	DV DATA IN 4	I	DIGITAL VIDEO DATA IN 4	
4	DV DATA IN 1	I	DIGITAL VIDEO DATA IN 1	
5	REF REC SW	I	REFERENCE REC SWITCH	
6	REC VITC			
7	VITC GATE			
8	REC CF	I	REC COLOR FRAMING	
9	EXT CF IN	I	EXTERNAL COLOR FRAME IN	
10	AV DATA IN 7	I	ANALOG VIDEO DATA IN 7	
11	AV DATA IN 7 (NEG)	I	ANALOG VIDEO DATA IN 7 (NEG)	
12	AV DATA IN 4	I	ANALOG VIDEO DATA IN 4	
13	AV DATA IN 4 (NEG)	I	ANALOG VIDEO DATA IN 4 (NEG)	
14	AV DATA IN 1	I	ANALOG VIDEO DATA IN 1	
15	AV DATA IN 1 (NEG)	I	ANALOG VIDEO DATA IN 1 (NEG)	
16	AV LALT	I	AV LINE ALTERNATE	
17	AV CF	I	ANALOG VIDEO CF	
18	CH0 REC	O		
19	CH1 REC	O		
20	REC CLK	I		
21	REC CLK (NEG)	I		
22	REC CLK GND			
23	BYP 11	O	BYPASS 11	
24	BYP 8	O	BYPASS 8	
25	BYP 5	O	BYPASS 5	
26	BYP 2	O	BYPASS 2	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P005 A (L3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5				
6				
7	VALID F	O	VALID FLAG	
8	PB FLD	O	PLAYBACK FIELD	
9	SEGU 0	O	SEGMENT	
10	SEGM VAGUE	O	SEGMENT VAGUE	
11	SYNC + CH0			
12	SYNC - CH0			
13				
14				
15	BYP2 4FSC	I	BYPASS 4FSC	
16	BYP2 4FSC (NEG)	I	BYPASS 4FSC (NEG)	
17	TEST EE 2	I		
18	PB DATA CH0	I		
19	PB CLOCK CH0	I		
20	PB DATA CH1	I		
21	PB CLOCK CH1	I		
22	ENV DET CH0		ENVELOPE DETECT CH0	
23	ENV DET CH1		ENVELOPE DETECT CH1	
24	AV AB 13	I	AV ADDRESS BUS	
25	AV AB 10	I	AV ADDRESS BUS	
26	AV AD 7	I	AV ADDRESS DATA BUS	
27	AV AD 4	I	AV ADDRESS DATA BUS	
28	AV AD 1	I	AV ADDRESS DATA BUS	
29	AV RD	I	AV READ	
30				
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P006 A' (L3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB DATA 6	I		
3	PB DATA 3	I		
4	PB DATA 0	I		
5	PB HST		PLAYBACK H START	
6	PB FN 0		PLAYBACK FIELD NO.0	
7	REF HST		REFERENCE H START	
8	REF FN 0		REFERENCE FIELD NO.0	
9	SYS 4FSC	O	SYSTEM 4FSC	
10	SYS 4FSC (NEG)	O	SYSTEM 4FSC (NEG)	
11	AU DATA IN 0	I	AUDIO REC DATA	
12	AU DATA IN 3	I	AUDIO REC DATA	
13	AU DATA IN 6	I	AUDIO REC DATA	
14				
15	PBD 12	O	PLAYBACK DATA CH1/CH2	
16	STO	O	STATUS DATA	
17				
18				
19				
20				
21				
22				
23	BYP 9	I	BYPASS 9	
24	BYP 6	I	BYPASS 6	
25	BYP 3	I	BYPASS 3	
26	BYP 0	I	BYPASS 0	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P005 B (L3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	MCK	I	AUDIO MASTER CLOCK	
6	MCK (NEG)	I	AUDIO MASTER CLOCK (NEG)	
7				
8	MUTE 12	O	MUTE CH1/CH2	
9	SEG - 1	O	SEGMENT 1	
10	PB - FNO		PLAYBACK FIELD NO.	
11	SYNC + CH1			
12	SYNC - CH1			
13	PCON CLK		PITCH CONTROL CLOCK	
14	PCON CLK GND			
15	BYP2 2FSC	I	BYPASS 2 2FSC	
16	BYP2 2FSC (NEG)	I	BYPASS 2 2FSC (NEG)	
17				
18	PB DATA CH0 (NEG)	O		
19	PB CLOCK CH0 (NEG)	O		
20	PB DATA CH1 (NEG)	O		
21	PB CLOCK CH1 (NEG)	O		
22				
23				
24	AV AB 14	I	AV ADDRESS BUS	
25	AV AB 11	I	AV ADDRESS BUS	
26	AV AB 8	I	AV ADDRESS BUS	
27	AV AD 5	I	AV ADDRESS DATA BUS	
28	AV AD 2	I	AV ADDRESS DATA BUS	
29	AV ALE	I	AV ADDRESS LOAD ENABLE	
30	AV RESET	I	AV RESET	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P006 B' (L3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB DATA 7	I		
3	PB DATA 4	I		
4	PB DATA 1	I		
5	PB FLDST		PLAYBACK FIELD START	
6	ERR STRB		ERROR STROBE	
7	REF FLDST		REFERENCE FIELD START	
8	REF FN1		REFERENCE FIELD NO.1	
9	SYS 2FSC		SYSTEM 2FSC	
10	SYS 2FSC (NEG)		SYSTEM 2FSC (NEG)	
11	AU DATA IN 1	I	AUDIO REC DATA	
12	AU DATA IN 4	I	AUDIO REC DATA	
13	AU DATA IN 7	I	AUDIO REC DATA	
14				
15	PBD 34	O	PLAYBACK DATA CH3/CH4	
16	ST FLG	O	STATUS ERROR FLAG	
17				
18				
19				
20				
21				
22				
23	BYP 10		BYPASS 10	
24	BYP 7		BYPASS 7	
25	BYP 4		BYPASS 4	
26	BYP 1		BYPASS 1	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P005 C (L3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	PB RST	I	PLAYBACK RESET	
6	PB FN	O	PLAYBACK FIELD NO.0	
7	PB 5F	O	PLAYBACK LEAP FIELD	
8	MUTE 34	O	MUTE CH3/CH4	
9				
10	REC FN 0	O	REC FIELD NO.0	
11				
12	PB TP FRAME		PLAYBACK TAPE FRAME	
13	PB H SW	I		
14				
15	BYP3 WCK	I	BYPASS 3 WRITE CLOCK	
16	BYP 3 WCK (NEG)	I	BYPASS 3 WRITE CLOCK (NEG)	
17				
18	PB DATA CH0 GND			
19	PB CLOCK CH0 GND			
20	PB DATA CH1 GND			
21	PB CLOCK CH1 GND			
22				
23	SEL REC SW	I	SELECT REC SWITCH	
24	AV AB 15	I	AV ADDRESS BUS	
25	AV AB 12	I	AV ADDRESS BUS	
26	AV AB 9	I	AV ADDRESS BUS	
27	AV AD 6	I	AV ADDRESS DATA BUS	
28	AV AD 3	I	AV ADDRESS DATA BUS	
29	AV AD 0	I	AV ADDRESS DATA BUS	
30	AV WR	I	AV WRITE	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P006 C' (L3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB FLAG	O	PLAYBACK FLAG	
3	PB DATA 5	I		
4	PB DATA 2	I		
5	PB CFST		PLAYBACK COLOR FRAME START	
6				
7				
8	REF FN2		REFERENCE FIELD NO.2	
9	REC FNO DL	O	REC FIELD NO.Ø DELAY	
10				
11	AU DATA IN 2	I	AUDIO REC DATA	
12	AU DATA IN 5	I	AUDIO REC DATA	
13	AU DATA GND		AUDIO REC DATA GND	
14				
15				
16	BLK SYNC	O	STATUS SYNC	
17				
18				
19				
20				
21				
22				
23	BYP 11	I	BYPASS 11	
24	BYP 8	I	BYPASS 8	
25	BYP 5	I	BYPASS 5	
26	BYP 2	I	BYPASS 2	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P007 A (L4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	+8V (UN)		+8V (UNREGULATED)	
6	-8V (UN)		-8V (UNREGULATED)	
7	INCOM HR	I	INCOME H RESET	
8	INCOM FNO	I	INCOME FIELD NO.0	
9	BYP1 4FSC		BYPASS 1 4FSC	
10	BYP1 4FSC (NEG)		BYPASS 1 4FSC (NEG)	
11	REF HO	O	REFERENCE H OUT	
12	REF CS	O	REFERENCE COMPOSITE SYNC	
13	H RST		H RESET	
14	INCOM CS	I	INCOME COMPOSITE SYNC	
15	FV/2		FRAME PULSE	
16	90Hz/100Hz	I		
17	REF REC SW		REFERENCE REC SWITCH	
18	SPI HO			
19	PB COMP SYNC	O	PLAYBACK COMPOSITE SYNC	
20	REF VIDEO IN	I		
21	REF VIDEO IN GND			
22	BLACK BURST			
23	BLACK BURST GND			
24	AV AB 13	O	AV ADDRESS BUS	
25	AV AB 10	O	AV ADDRESS BUS	
26	AV AD 7	O	AV ADDRESS DATA BUS	
27	AV AD 4	O	AV ADDRESS DATA BUS	
28	AV AD 1	O	AV ADDRESS DATA BUS	
29	AV RD	O	AV READ	
30	AV SYS INT			
31	AV BUSY			
32	GND (D)		GND (DIGITAL CIRCUIT)	

P008 A' (L4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB DATA 6	I		
3	PB DATA 3	I		
4	PB DATA 0	I		
5	PB HST	I	PLAYBACK H START	
6	PB FN 0	I	PLAYBACK FIELD NO.0	
7	REF HST	I	REFERENCE H START	
8	REF FN 0	I	REFERENCE FIELD NO.0	
9	SYS 4FSC	O	SYSTEM 4FSC	
10	SYS 4FSC (NEG)	O	SYSTEM 4FSC (NEG)	
11	AV DATA 5	O	ANALOG VIDEO DATA 5	
12	AV DATA 2	O	ANALOG VIDEO DATA 2	
13	AV DATA -1	O	ANALOG VIDEO DATA 1	
14	AV CLK 0		ANALOG VIDEO CLOCK	
15	DV DATA OUT 5	O	DIGITAL VIDEO DATA OUT 5	
16	DV DATA OUT 5 (NEG)	O	DIGITAL VIDEO DATA OUT 5 (NEG)	
17	DV DATA OUT 2	O	DIGITAL VIDEO DATA OUT 2	
18	DV DATA OUT 2 (NEG)	O	DIGITAL VIDEO DATA OUT 2 (NEG)	
19	DV DATA OUT -1	O	DIGITAL VIDEO DATA OUT 1	
20	DV DATA OUT -1 (NEG)	O	DIGITAL VIDEO DATA OUT 1 (NEG)	
21				
22				
23	BYP 9	I	BYPASS 9	
24	BYP 6	I	BYPASS 6	
25	BYP 3	I	BYPASS 3	
26	BYP 0	I	BYPASS 0	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P007 B (L4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2				
3				
4				
5				
6				
7	INCOM REC SW		INCOME REC SWITCH	
8	INCOM FN 1	I	INCOME FIELD NO.1	
9	PCON CLK (4.5M)	I	PITCH CONTROL CLOCK	
10	PCON CLK GND			
11	REF FRM	O	REFERENCE FRAME	
12	REF VS	O	REFERENCE V SYNC	
13				
14	INCOM LALT		INCOME ALTERNATE	
15	FV/4		QUATER FIELD PULSE	
16	CAP FG1			
17				
18	SPI VD			
19	PB VITC			
20	EXT CF IN	I	EXTERNAL COLOR FRAMING IN	
21	EXT CF IN GND			
22	CF PULSE		COLOR FRAME PULSE	
23	CF PULSE GND			
24	AV AB 14	O	AV ADDRESS BUS	
25	AV AB 11	O	AV ADDRESS BUS	
26	AV AB 8	O	AV ADDRESS BUS	
27	AV AD 5	O	AV ADDRESS DATA BUS	
28	AV AD 2	O	AV ADDRESS DATA BUS	
29	AV ALE	O	AV ADDRESS LOAD ENABLE	
30	AV RESET	O	AV RESET	
31	VCP RESET			
32	GND (A)		GND (ANALOG CIRCUIT)	

P008 B' (L4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB DATA 7	I		
3	PB DATA 4	I		
4	PB DATA 1	I		
5	PB FLDST	I	PLAYBACK FIELD START	
6	ERR STRB	I	ERROR STROBE	
7	REF FLDST		REFERENCE FIELD START	
8	REF FN1	I	REFERENCE FIELD NO.1	
9	SYS 2FSC		SYSTEM 2FSC	
10	SYS 2FSC (NEG)		SYSTEM 2FSC (NEG)	
11	AV DATA 6	O	ANALOG VIDEO DATA 6	
12	AV DATA 3	O	ANALOG VIDEO DATA 3	
13	AV DATA 0	O	ANALOG VIDEO DATA 0	
14	AV CLK 0 (NEG)	O	ANALOG VIDEO CLOCK 0 (NEG)	
15	DV DATA OUT 6	O	DIGITAL VIDEO DATA OUT 6	
16	DV DATA OUT 6 (NEG)	O	DIGITAL VIDEO DATA OUT 6 (NEG)	
17	DV DATA OUT 3	O	DIGITAL VIDEO DATA OUT 3	
18	DV DATA OUT 3 (NEG)	O	DIGITAL VIDEO DATA OUT 3 (NEG)	
19	DV DATA OUT 0	O	DIGITAL VIDEO DATA OUT 0	
20	DV DATA OUT 0 (NEG)	O	DIGITAL VIDEO DATA OUT 0 (NEG)	
21	DV CLK 0		DIGITAL VIDEO CLK 0	
22	DV CLK 0 (NEG)		DIGITAL VIDEO CLK 0 (NEG)	
23	BYP 10	I	BYPASS 10	
24	BYP 7	I	BYPASS 7	
25	BYP 4	I	BYPASS 4	
26	BYP 1	I	BYPASS 1	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P007 C (L4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8	INCOM FN2	I	INCOME FIELD NO.2	
9	CMPSY	O	COMPOSITE SYNC	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	REF CF	O	REFERENCE COLOR FRAME	
12	REF CLK	O	REFERENCE CLOCK	
13	REF CLK (NEG)	O	REFERENCE CLOCK (NEG)	
14	INCOM SC	I	INCOME SUB CARRIER	
15	FV/8	O	PAL CF	
16	CAP DIR		CAPSTAN DIRECTION	
17				
18	PB V SYNC	O		
19				
20	TXD			
21	TXD L			
22	RXD			
23	RXD L			
24	AV AB 15	O	AV ADDRESS BUS	
25	AV AB 12	O	AV ADDRESS BUS	
26	AV AB 9	O	AV ADDRESS BUS	
27	AV AD 6	O	AV ADDRESS DATA BUS	
28	AV AD 3	O	AV ADDRESS DATA BUS	
29	AV AD 0	O	AV ADDRESS DATA BUS	
30	AV WR	O	AV WRITE	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P008 C' (L4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB FLAG			
3	PB DATA 5	I		
4	PB DATA 2	I		
5	PB CFST	I	PLAYBACK COLOR FRAME START	
6				
7				
8	REF FN 2	I	REFERENCE FIELD NO.2	
9	SYNC BLNK		SYNC BLANKING	
10	BURST FLAG			
11	AV DATA 7	O	ANALOG VIDEO DATA 7	
12	AV DATA 4	O	ANALOG VIDEO DATA 4	
13	AV DATA 1	O	ANALOG VIDEO DATA 1	
14	AV DATA -2	O	ANALOG VIDEO DATA 2	
15	DV DATA OUT 7	O	DIGITAL VIDEO DATA OUT 7	
16	DV DATA OUT 7 (NEG)	O	DIGITAL VIDEO DATA OUT 7 (NEG)	
17	DV DATA OUT 4	O	DIGITAL VIDEO DATA OUT 4	
18	DV DATA OUT 4 (NEG)	O	DIGITAL VIDEO DATA OUT 4 (NEG)	
19	DV DATA OUT 1	O	DIGITAL VIDEO DATA OUT 1	
20	DV DATA OUT 1 (NEG)	O	DIGITAL VIDEO DATA OUT 1 (NEG)	
21	DV DATA OUT -2	O	DIGITAL VIDEO DATA OUT 2	
22	DV DATA OUT -2 (NEG)	O	DIGITAL VIDEO DATA OUT 2 (NEG)	
23	BYP 11	I	BYPASS 11	
24	BYP 8	I	BYPASS 8	
25	BYP 5	I	BYPASS 5	
26	BYP 2	I	BYPASS 2	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P201 A (S1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4	AT CH0 A GND			
5	AT CH0 A	I		
6	AT CH0 B GND			
7	AT CH0 B	I		
8	AT GND			
9				
10				
11				
12	REC DATA GND			
13	REC DATA CH0	I		
14	REC DATA GND			
15	REC DATA CH1	I		
16	REC CLK GND			
17	REC CLK	I		
18	REC CLK GND			
19	CH1 REC	I		
20	TEST EE2	I		
21				
22				
23				
24	REC ENV CH0	O	REC ENVELOPE CH0	
25	GND (A)		GND (ANALOG CIRCUIT)	
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P202 A' (S1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	RF WFM GND			
2	AT ENV CH0	O	ENVELOPE CH0	
3				
4	EE CH0 DATA GND			
5	EE CH0 DATA	I		
6	EE CH1 DATA GND			
7	EE CH1 DATA	I		
8				
9				
10				
11				
12				
13				
14	ENV DET CH0	O	ENVELOPE DETECT CH0	
15	PB DATA CH0 GND			
16	PB DATA CH0	O		
17	PB CLOCK CH0 GND			
18	PB CLOCK CH0	O		
19				
20	GND (A)		GND (ANALOG CIRCUIT)	
21	PB MODE	I		
22	REC MODE	I		
23	EQ GAIN CH0	I	EQUALIZER GAIN CH0	
24	TEST MODE	I		
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P201 B (S1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4	GND (A)		GND (ANALOG CIRCUIT)	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7	GND (A)		GND (ANALOG CIRCUIT)	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		GND (ANALOG CIRCUIT)	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		GND (ANALOG CIRCUIT)	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	GND (A)		GND (ANALOG CIRCUIT)	
19				
20				
21	H SW CH1	I	HEAD SWITCH CH1	
22	H SW CH0	I	HEAD SWITCH CH0	
23	SER H SW	I	SERIAL HEAD SWITCH	
24	GND (A)		GND (ANALOG CIRCUIT)	
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P202 B' (S1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		GND (ANALOG CIRCUIT)	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		GND (ANALOG CIRCUIT)	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	GND (A)		GND (ANALOG CIRCUIT)	
19	GND (A)		GND (ANALOG CIRCUIT)	
20	GND (A)		GND (ANALOG CIRCUIT)	
21	REC CURR CH1	I	REC CURRENT CH1	
22	REC CURR CH0	I	REC CURRENT CH0	
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P201 C (S1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5	AT CH0 A L	I		
6	AT CH0 A GND			
7	AT CH0 B L	I		
8	AT CH0 B GND			
9				
10				
11				
12	REC DATA GND			
13	REC DATA CH0 L	I		
14	REC DATA GND			
15	REC DATA CH1 L	I		
16	REC DATA GND			
17	REC CLK L	I		
18	REC CLK GND			
19	CH0 REC	I		
20	FLY ERASE	I	FLYING ERASE	
21				
22				
23				
24	REC ENV CH1	O	REC ENVELOPE CH1	
25	GND (A)	O	GND (ANALOG CIRCUIT)	
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P202 C' (S1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	RF WFM	O		
2	ENV CH0 GND			
3				
4				
5	EE CH0 DATA L	I		
6	EE CH0 DATA GND			
7	EE CH1 DATA L	I		
8	EE CH1 DATA GND			
9				
10				
11				
12				
13				
14				
15				
16	PB DATA CH0 L	O		
17	PB DATA CH0 GND			
18	PB CLOCK CH0 L	O		
19	PB CLOCK CH0 GND			
20	HT SPEED	I	HEAD TAPE RELATIVE SPEED	
21	RF WFM SELECT 0	I		
22	RF WFM SELECT 1	I		
23	EQ FREQ CH0	I	EQUALIZER FREQUENCY CH0	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P203 A (S2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4	AT CH1 A GND			
5	AT CH1 A	I		
6	AT CH1 B GND			
7	AT CH1 B	I		
8	AT CH0 A GND			
9	AT CH0 A	I		
10	AT CH0 B GND			
11	AT CH0 B	I		
12				
13				
14				
15				
16				
17				
18				
19				
20	TEST EE2	I		
21				
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P204 A' (S2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	RF WFM GND			
2	AT ENV CH1	O	AT ENVELOPE CH1	
3	AT ENV CH0	O	AT ENVELOPE CH0	
4	EE CH1 DATA GND			
5	EE CH1 DATA	I		
6	EE CH0 DATA GND			
7	EE CH0 DATA	I		
8				
9	ENV DET CH0	O	ENVELOPE DETECTER CH0	
10	PB DATA CH0 GND			
11	PB DATA CH0	O		
12	PB CLOCK CH0 GND			
13	PB CLOCK CH0	O		
14	ENV DET CH1	O	ENVELOPE DETECTER CH1	
15	PB DATA CH1 GND			
16	PB DATA CH1	O		
17	PB CLOCK CH1 GND			
18	PB CLOCK CH1	O		
19				
20	GND (A)		GND (ANALOG CIRCUIT)	
21	PB MODE	I		
22				
23	EQ GAIN CH1	I	EQUALIZER GAIN CH1	
24	EQ GAIN CH0	I	EQUALIZER GAIN CH0	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P203 B (S2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4	GND (A)		GND (ANALOG CIRCUIT)	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7	GND (A)		GND (ANALOG CIRCUIT)	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		GND (ANALOG CIRCUIT)	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		GND (ANALOG CIRCUIT)	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	GND (A)		GND (ANALOG CIRCUIT)	
19				
20				
21				
22	H SW CH1	I	HEAD SWITCH CH1	
23	H SW CH0	I	HEAD SWITCH CH0	
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P204				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (A)		GND 9ANALOG CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		GND (ANALOG CIRCUIT)	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		GND (ANALOG CIRCUIT)	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	GND (A)		GND (ANALOG CIRCUIT)	
19	GND (A)		GND (ANALOG CIRCUIT)	
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P203 C (S2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5	AT CH1 A L	I		
6	AT CH1 A GND			
7	AT CH1 B L	I		
8	AT CH1 B GND			
9	AT CH0 A L	I		
10	AT CH0 A GND			
11	AT CH0 B L	I		
12	AT CH0 B GND			
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P204 C' (S2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	RF WFM	O		
2	ENV CH1 GND			
3	ENV CH0 GND			
4				
5	EE CH1 DATA L	I		
6	EE CH1 DATA GND			
7	EE CH0 DATA L	I		
8	EE CH0 DATA GND			
9				
10	PB DATA CH0 L	O		
11	PB DATA CH0 GND			
12	PB CLOCK CH0 L	O		
13	PB CLOCK CH0 GND			
14				
15				
16	PB DATA CH1 L	O		
17	PB DATA CH1 GND			
18	PB CLOCK CH1 L	O		
19	PB CLOCK CH1 GND			
20	HT SPEED	I	HEAD TAPE RELATIVE SPEED	
21	RF WFM SELECT 0	I		
22	RF WFM SELECT 1	I		
23	EQ FREQ CH1	I	EQUALIZER FREQUENCY CH1	
24	EQ FREQ CH0	I	EQUALIZER FREQUENCY CH0	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P205 A (S3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2				
3	GND (A)		GND (ANALOG CIRCUIT)	
4	GND (A)		TC R/P HEAD GND	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19	REC LTC	I	REC LTC DATA	
20				
21	FULERA L	I	FULL ERASE LOW	
22	CUEERA L	I	CUE ERASE LOW	
23	CUEREC L	I	CUE REC LOW	
24	MUTE L	I	MUTE LOW	
25	REC VR	I	CUE REC VR	
26	SIG MUT	O	SIGNAL MUTE	
27	+24V (UN)		+24V (UNREGULATED)	
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GDN (D)		GND (DIGITAL CIRCUIT)	

P206 A' (S3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6	GND (A)		GND (ANALOG CIRCUIT)	
7	GND (A)		GND (ANALOG CIRCUIT)	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		CUE IN GND	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		D MIX DATA GND	
17	GND (A)		GND (ANALOG CIRCUIT)	
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P205 B (S3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2				
3	GND (A)		GND (ANALOG CIRCUIT)	
4	TC HEAD -	I/O	TC R/P HEAD C	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19	PB LTC	O	PLAYBACK LTC	
20				
21	OSC ON L	I	OSC ON LOW	
22	TCERA L	I	TC ERASE LOW	
23	TCREC L	I	TC REC LOW	
24	ATT 1	I	ATTENUATOR 1	
25	CUE PB VR	I	CUE PLAYBACK VR	
26				
27	+24V (UN)		+24V (UNREGULATED)	
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P206 B' (S3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6	GND (A)		GND (ANALOG CIRCUIT)	
7	GND (A)		CUE METER GND	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		CUE OUT GND	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	CUE IN C	I	CUE IN COLD	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	CUE D C	I	D MIX DATA COLD	
17	GND (A)		GND (ANALOG CIRCUIT)	
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P205 C (S3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2				
3	GND (A)		GND (ANALOG CIRCUIT)	
4	TC HEAD +	I/O	TC R/P HEAD H	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7				
8				
9	RESET	I	SYSTEM RESET	
10				
11				
12				
13				
14				
15				
16				
17				
18				
19	GND (A)		GND (ANALOG CIRCUIT)	
20	X3FOR	I		
21	ERA CHK	O	ERASE CHECK	
22	CTLER A L	I	CTL ERASE LOW	
23	CUE EE	I	CUE EE	
24	ATT 2	I	ATTENUATOR 2	
25	CUE MIX	I	D MIX SELECT	
26				
27	+24V (UN)		+24V (UNREGULATED)	
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P206 C' (S3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6	GND (A)		GND (ANALOG CIRCUIT)	
7	CUE METER	O	CUE METER	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	CUE OUT	O	CUE OUT	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	CUE IN H	I	CUE IN HOT	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	CUE D H	I	D MIX DATA HOT	
17	GND (A)		GND (ANALOG CIRCUIT)	
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P207 A (S4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SEG-0	I	SEGMENT-0	
10	PB FNO	I	PLAYBACK FIELD NO.0	
11				
12				
13				
14				
15				
16				
17				
18				
19	STRN B	I	STRAIN B	
20	PAT A G	O	PATTERN A HEAD	
21	PAT B G	O	PATTERN B HEAD	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P208 A' (S4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	ENV CH0	I	ENVELOPE CH0	
3	ENV CH0 GND	I	ENVELOPE CH0 GND	
4	ENV CH1	I	ENVELOPE CH1	
5	ENV CH1 GND	I	ENVELOPE CH1 GND	
6				
7				
8				
9				
10	AT OT DT	O	AT OUT DATA	
11	ADV H SW	I	ADVANCE HEAD SWITCH	
12	ADV H SW GND	I	ADVANCE HEAD SWITCH GND	
13	CAP FB	O	CAPSTAN FEEDBACK	
14	CAP FB G	O	CAPSTAN FEEDBACK GND	
15				
16	CAP F/R	O	CAPSTAN FORWARD/REVERSE	
17				
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P207 B (S4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SEG 1	I	SEGMENT 1	
10	SEG VAG	I	SEGMENT VAGUE	
11				
12				
13				
14				
15	FR GATE	O	FRAME GATE	
16	FV/2	I	FRAME REFERENCE	
17				
18				
19	STRN G	I	STRAIN GND	
20	PAT A	O	PATTERN A	
21	PAT B	O	PATTERN B	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P208 B' (S4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6				
7	AC CTL	I	CTL PULSE	
8				
9				
10	AT IN DT	I	AT IN DATA	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P207 C (S4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SYNC+CH0	I	OFF TAPE SYNC+CH0	
10	SYNC-CH0	I	OFF TAPE SYNC-CH0	
11				
12	SYNC+CH1	I	OFF TAPE SYNC+CH1	
13	SYNC-CH1	I	OFF TAPE SYNC-CH1	
14				
15				
16				
17				
18				
19	STRN A	I	STRAIN A	
20	HV MONI	I	HIGH VOLTAGE MONITOR	
21	HV ON	O	HIGH VOLTAGE ON	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P208 C' (S4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6	SER ADR0	I	SERIAL ADDRESS 0	
7	SER ADR1	I	SERIAL ADDRESS 1	
8	SER ADR2	I	SERIAL ADDRESS 2	
9				
10	AT CLK	I	AT CLOCK	
11				
12				
13	CNF H	O	CONFIDENCE HIGH	
14	CAP FG 1	I	CAPSTAN FG 1	
15				
16	CAP FG 2	I	CAPSTAN FG 2	
17				
18	REC ENV CH0	I	REC ENVELOPE CH0	
19	REC ENV CH0 GND	I	REC ENVELOPE CH0 GND	
20	R ENV1	I	REC ENVELOPE CH1	
21	REC ENV CH1 GND	I	REC ENVELOPE CH1 GND	
22	MRST	I	MASTER RESET	
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P209 A (S5)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DRUM FG	I	DRUM FG	
3	PG -	I	DRUM PG -	
4	FG 1	I	CAPSTAN FG 1	
5	TPH 1	I	TAKE UP FG 1	
6	SPH 2	I	SUPPLY FG 2	
7	TEN GND	O	TENSION SENSOR GND	
8	TEN VCC	O	TENSION SENSOR VCC	
9	CTL HE +	I	CONTROL HEAD +	
10	D STOP L	O	DRUM STOP LOW	
11				
12	CAP EDS	O	CAPSTAN FWD/REV/STOP	
13				
14	TERR	O	T-REEL DRIVE ERR	
15				
16	90/100Hz	I	HEAD SWITCH REFERENCE	
17	FV/8	I	CF REFERENCE (PAL)	
18				
19	FVVCC	O	REEL FG SENSOR VCC	
20				
21	DRUM RST	I	DRUM RESET	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P210 A' (S5)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5	A/C CTL	O	CTL PULSE	
6	SER ADAT	I	SERIAL DATA (TO SERVO)	
7	SER BDAT	O	SERIAL DATA (TO SYSCON)	
8	SER CLK	I	SERIAL CLOCK	
9	S FG	O	SUPPLY FG	
10	AT OT DT	I	SERIAL OUTPUT DATA FROM AT	
11	ADV H.SW	O	ADVANCE HEAD SWITCH	
12	ADV H SW GND	O	ADVANCE HEAD SWITCH GND	
13	CAP FB	I	CAPSTAN FEEDBACK (FROM AT)	
14	CAP FB G	I	CAPSTAN FEEDBACK GND	
15				
16	CAP F/R	I	CAPSTAN FOWARD/REVERSE FROM AT	
17				
18	SER H.SW	O	SERIAL HEAD SWITCH	
19	HT SPEED GND	O	HEAD-TAPE RERATIVE SPEED GND	
20				
21				
22	R ENV1	I	REC ENVELOPE CH1	
23	AG (R ENV1 G)	I	REC ENVELOPE CH1 GND	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P209 B (S5)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AG	I	DRUM FG GND	
3	V FG +	O	CAPSTAN FG SENSOR VCC	
4	FG 2	I	CAPSTAN FG 2	
5	TPH 2	I	TAKE UP FG 2	
6				
7	AG (CTL S)	I	ANALOG GND (CTL SHIELD)	
8	S TENTION	I	SUPPLY TENSION	
9	CTL HE -	I	CONTROL HEAD -	
10	D ERR	O	DRUM ERROR	
11	DRUM REF GND	O	DRUM REFERENCE GND	
12	CAP ERR	O	CAPSTAN ERROR	
13	CAP REF GND	O	CAPSTAN REFERENCE GND	
14	SERR	O	S-REEL DRIVE ERROR	
15	FR GATE	I	FRAME GATE	
16	FV/2	I	FRAME REFERENCE	
17	PB FRAME	O	PLAYBACK TAPE FRAME	
18				
19	FG GND (SFG GND)	O	REEL FG SENSOR GND	
20				
21	CAP RST	I	CAPSTAN RESET	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P210 B' (S5)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4	SYS FRM	O	CTL FRAME	
5		O	CTL CF	
6	SER AD 0	I	SERIAL ADDRESS 0	
7	SER AD 1	I	SERIAL ADDRESS 1	
8	SER AD 2	I	SERIAL ADDRESS 2	
9	T-FG	O	TAKE UP FG	
10	AT IN DT	O	SERIAL INPUT DATA TO AT	
11	REC H.SW	O	REC HEAD SWITCH	
12	REC H SW GND	O	REC HEAD SWITCH GND	
13				
14	WFM CTL	O	WAVEFORM CTL	
15	AG (GND A)	O	WAVEFORM CTL GND	
16				
17				
18	SER HSW GND	O	SERIAL HSW GND	
19	REC ENV CH0	I	REC ENVELOPE CH0	
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P209 C (S5)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PG +	I	DRUM PG +	
3	V FG G	O	CAPSTAN FG SENSOR GND	
4				
5	SPH 1	I	SUPPLY FG 1	
6				
7				
8	PNCH-ON	I	PINCH ON	
9	D BRK L	O	DRUM BRAKE LOW	
10	DRUM ERR GND	O	DRUM ERROR GND	
11	D SW L	O	DRUM SWITCH LOW	
12	CAP ERR GND	O	CAPSTAN ERROR GND	
13	CAP RCC	O	CAPSTAN RIPPLE CANCEL	
14	+2.5VA	O	SERVO REF +2.5[V]	
15				
16	FV/4	I	CF REFERENCE (NTSC)	
17	PB H.SW	O	PLAYBACK HEAD SWITCH	
18				
19	FG GND (TFG GND)	O	REEL FG SENSOR GND	
20				
21	REEL RST	I	REEL RESET	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P210 C' (S5)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4	3FRM	I	FRAME REFERENCE AT X3 FORMAT	
5	3CF	I	CF REFERENCE AT X3 FORMAT	
6	SER SEL 0	I	SERIAL SELECT 0	
7	SER SEL 1	I	SERIAL SELECT 1	
8	CAP DIR	O	CAPSTAN DIRECTION	
9	CAP FGP	O	CAPSTAN FG PULSE	
10	AT CLK	O	SERIAL CLOCK (TO AT)	
11	CNF H.SW	O	CONFIDENCE HEAD SWITCH	
12	CNF H SW GND	O	CONFIDENCE HEAD SWITCH GND	
13	CNF H	I	CONFIDENCE HIGH	
14	CAP FG1	O	CAPSTAN FG 1	
15				
16	CAP FG2	O	CAPSTAN FG 2	
17				
18	HT SPD	O	HEAD TAPE RELATIVE SPEED	
19	REC ENV CH0 GND	I	REC ENVELOPE CH0 GND	
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P211 A (S6)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SYS DB 0	I/O	SYSCON DATA BUS 0	
10	SYS DB 1	I/O	SYSCON DATA BUS 1	
11	SYS DB 2	I/O	SYSCON DATA BUS 2	
12	SYS DB 3	I/O	SYSCON DATA BUS 3	
13	SYS DB 4	I/O	SYSCON DATA BUS 4	
14	SYS DB 5	I/O	SYSCON DATA BUS 5	
15	SYS DB 6	I/O	SYSCON DATA BUS 6	
16	SYS DB 7	I/O	SYSCON DATA BUS 7	
17	TC INT	O	TC INTERRUPT	
18				
19				
20				
21	FULL ERASE	O		
22	CUE ERASE	O		
23	CUE REC	O		
24	MUTE	O		
25	CUE REC VR	O		
26	REC LTC	O		
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P212 A' (S6)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	T/C IN +	I		
3	T/C OUT +	O		
4				
5	AC-CTL	I		
6	TRANSMIT A 1	I/O		
7	TRANSMIT B 1	I/O		
8	RECEIVE A 1	I/O		
9	RECEIVE B 1	I/O		
10	TXD	O	RS232C TXD	
11	CTS	I	RS232C CTS	
12	CHAR SIG	O	CHARACTER SIGNAL	
13	SPI HD	I	SUPER INPOSE HP	
14	PB VITC	I		
15	REC CF	I	REC COLOR PRAME	
16	4FSC CLK	I		
17	DIO 1	I/O	GPIB DATA	
18	DIO 4	I/O	GPIB DATA	
19	DIO 7	I/O	GPIB DATA	
20	DAV	I/O	GPIB STATUS	
21	ATN	I/O	GPIB STATUS	
22	REM	I/O	GPIB STATUS	
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P211 B (S6)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SYS AB 0	I	SYSCON ADDRESS BUS 0	
10	SYS AB 1	I	SYSCON ADDRESS BUS 1	
11	SYS AB 2	I	SYSCON ADDRESS BUS 2	
12	SYS AB 3	I	SYSCON ADDRESS BUS 3	
13	SYS AB 4	I	SYSCON ADDRESS BUS 4	
14	SYS AB 5	I	SYSCON ADDRESS BUS 5	
15	SYS AB 6	I	SYSCON ADDRESS BUS 6	
16	SYS AB 7	I	SYSCON ADDRESS BUS 7	
17	SYS AB 8	I	SYSCON ADDRESS BUS 8	
18	SYS AB 9	I	SYSCON ADDRESS BUS 9	
19	SYS AB 10	I	SYSCON ADDRESS BUS 10	
20				
21	7 OSC ON	O		
22	TC ERASE	O		
23	TC REC	O		
24	ATT 1	O	ATTENUATOR 1	
25	CUE PB VR	O		
26	PB LTC	I		
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P212 B' (S6)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	T/C IN -	I		
3	T/C OUT -	O		
4				
5	SYS FRM	I	SYSTEM FRAME	
6	TRANSMIT A 2	I/O		
7	TRANSMIT B 2	I/O		
8	RECEIVE A 2	I/O		
9	RECEIVE B 2	I/O		
10	RXD	I	RS232C RXD	
11	DSR	I	RS232 DSR	
12	CHAR GATE	O	CHARACTER GATE	
13	SPI VD	I	SUPER INPOSE VD	
14	PB COMP SYNC	I		
15	REC VITC	I		
16	REC COMP SYNC	I		
17	DIO 2	I/O	GPIB DATA	
18	DIO 5	I/O	GPIB DATA	
19	DIO 8	I/O	GPIB DATA	
20	NRFD	I/O	GPIB STATUS	
21	IFC	I/O	GPIB STATUS	
22	EDI	I/O	GPIB STATUS	
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P211 C (S6)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SYS RESET	I	SYSCON RESET	
10	SYS IORD	I	SYSCON I/O READ	
11	SYS IOWR	I	SYSCON I/O WRITE	
12	SYS MERD	I	SYSCON MEMORY READ	
13	SYS MEWR	I	SYSCON MEMORY WRITE	
14	SYS BUSY	O	SYSCON BUSY	
15	SYS CS TC	I	SYSCON CHIP SELECT TC	
16	SYS CS REMT	I	SYSCON CHIP SELECT REMOTE	
17	REMT INT	O	REMOTE INTERRUPT	
18				
19				
20				
21	ERASE CHECK	I		
22	CTL ERASE	O		
23	CUE EE	O		
24	ATT 2	O	ATTENUATOR 2	
25	CUE MIX	O		
26				
27				
28	-5V (D)			
29	+5V (D)			
30	+5V (D)			
31	GND (D)			
32	GND (D)			

C' (S6)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	T/C IN GND			
3	T/C OUT GND			
4	X3FRM	O	X3 FORMAT FRAME PULSE	
5	X3CF	O	X3 FORMAT CF PULSE	
6	TRANSMIT A 3	I/O		
7	TRANSMIT B 3	I/O		
8	RECEIVE A 3	I/O		
9	RECEIVE B 3	I/O		
10	RTS	O	REQUEST TO SEND	
11	DTR	O	DATA TERMINAL READY	
12	DCD	I	DATA CARRIER DETECTED	
13				
14	PB V SYNC	I		
15	VITC GATE	I		
16	REC V SYNC	I		
17	DID 3	I/O	GPIB DATA	
18	DID 6	I/O	GPIB DATA	
19		I/O		
20	NDAC	I/O	GPIB STATUS	
21	SRQ	I/O	GPIB STATUS	
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P213 A (S7)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 0	I/O	AV ADDRESS DATA BUS 0	
3	AV AD 3	I/O	AV ADDRESS DATA BUS 3	
4	AV AD 6	I/O	AV ADDRESS DATA BUS 6	
5	AV AD 8	I/O	AV ADDRESS DATA BUS 8	
6	AV AB 11	I	AV ADDRESS BUS 11	
7	AV AB 14	I	AV ADDRESS BUS 14	
8	AV RD	I	AV READ	
9	SYS DB 0	I/O	SYSCON DATA BUS 0	
10	SYS DB 1	I/O	SYSCON DATA BUS 1	
11	SYS DB 2	I/O	SYSCON DATA BUS 2	
12	SYS DB 3	I/O	SYSCON DATA BUS 3	
13	SYS DB 4	I/O	SYSCON DATA BUS 4	
14	SYS DB 5	I/O	SYSCON DATA BUS 5	
15	SYS DB 6	I/O	SYSCON DATA BUS 6	
16	SYS DB 7	I/O	SYSCON DATA BUS 7	
17	TC INT	I		
18	REC V SYNC	I		
19	REC CF	I		
20	AT RST	O	AT RESET	
21	DRUM RST	O	DRUM RESET	
22	MCONT 5	O	MECH CONTROL 5	
23	PINCH ON	O		
24	MCONT 1	O	MECH CONTROL 1	
25	MCONT 2	O	MECH CONTROL 2	
26	T REEL DRV ON	O	T REEL DRIVE ON	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P214 A' (S7)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	F-SER A DATA +	O	FRONT CERIAL A DATA	SYS→FRONT
3	F-SER A DATA -	O		
4	F-SER A EN +	O	FRONT CERIAL A ENEBLE	SYS→FRONT
5	F-SER A EN -	O		
6	S-SER A DATA	O	SERVO SERIAL A DATA	SYS→SERVO
7	S-SER B DATA	I	SERVO SERIAL B DATA	SYS←SERVO
8	S-SER CLK	O	SERVO SERIAL CLOCK	
9	S-FG	I	S-REEL FG	CODER 1
10	CASS DET A	I	CASSETTE DATECTA	
11	S PHOTE	I	SUPPLY PHOTE	
12	T PHOTE	I	TAKE UP PHOTE	
13	SUB LOAD START	I		
14	SUB LOAD END	I		
15	CASS DET F	I	CASSETTE DATECT F	USER C (L)
16	CASS DET R	I	CASSETTE DETECT R	USER C (S,M)
17	CASS DET S	I	CASSETTE DETECT S	USER A (ALL)
18	CASS DET T	I	CASSETTE DETECT T	USER B (V/CTL)
19	SER H SW	I	SERIAL HEAD SWITCH	
20	REC MODE	O		
21	PB MODE	O		
22	REC CURR CH0	O		
23	REC CURR CH1	O		
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P213 B (S7)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 1	I/O	AV ADDRESS DATA BUS 1	
3	AV AD 4	I/O	AV ADDRESS DATA BUS 4	
4	AV AD 7	I/O	AV ADDRESS DATA BUS 7	
5	AV AB 9	I	AV ADDRESS DATA BUS 9	
6	AV AB 12	I	AV ADDRESS DATA BUS 12	
7	AV AB 15	I	AV ADDRESS DATA BUS 15	
8	AV WR	I	AV WRITE	
9	SYS AB 0	O	SYSCON ADDRESS BUS 0	
10	SYS AB 1	O	SYSCON ADDRESS BUS 1	
11	SYS AB 2	O	SYSCON ADDRESS BUS 2	
12	SYS AB 3	O	SYSCON ADDRESS BUS 3	
13	SYS AB 4	O	SYSCON ADDRESS BUS 4	
14	SYS AB 5	O	SYSCON ADDRESS BUS 5	
15	SYS AB 6	O	SYSCON ADDRESS BUS 6	
16	SYS AB 7	O	SYSCON ADDRESS BUS 7	
17	SYS AB 8	O	SYSCON ADDRESS BUS 8	
18	SYS AB 9	O	SYSCON ADDRESS BUS 9	
19	SYS AB 10	O	SYSCON ADDRESS BUS 10	
20	VCP RESET	O	AV CPU RESET	
21	CAP RST	O	CAPSTAN RESET	
22	MCONT 6	O	MECH CONTROL 6	
23	S BAK ON	O	SUPPLY BRAKE ON	
24	STP ON	O	STOP ON	
25	MCONT 3	O	MECH CONTROL 3	
26	S REEL DRV ON	O	SUPPLY REEL DRIVE ON	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P214 B' (S7)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1		I		
2	F-SER B DATA +	I	FRONT SERIAL B DATA	FRONT → SYS
3	F-SER B DATA -	I		
4	F-SER B EN +	I	FRONT SERIAL B ENABLE	FRONT → SYS
5	F-SER B EN -	I		
6	SER ADR0	O	SERVO SERIAL ADDRESS	DATA ADDRESS
7	SER ADR1	O		
8	SER ADR2	O		
9	T-FG	I	T-REEL FG	
10	CASS DET B	I	CASSETTE DETECT B	CODER 2
11	CASS IN SW L	I	CASSETTE IN SWITCH LEFT	
12	CASS UP SW	I	CASSETTE UP SWITCH	
13	L CASS IN	I	L CASSETTE IN	
14	MAIN LOAD START	I		
15	MAIN LOAD END	I		
16	MAIN LOAD CENTER	I		
17	SENS LED A	O	SENSOR LED A	
18	SENS LED K	O	SENSOR LED K	
19	AUTO OFF LAMP	O		
20	SUB LOAD CEN	I	SUB LOADING CENTER	
21	TEST MODE	O		
22	EQ GAIN CH0	O	EQUALIZER GAIN CH0	
23	EQ GAIN CH1	O	EQUALIZER GAIN CH1	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P213 C (S7)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 2	I/O	AV ADDRESS DATA BUS 2	
3	AV AD 5	I/O	AV ADDRESS DATA BUS 5	
4	AV ALE	I		
5	AV AB 10	I	AV ADDRESS BUS 10	
6	AV AB 13	I	AV ADDRESS BUS 13	
7	AV SYS INT	O	AV SYSCON INTERRUPT	
8	AV BUSY	O		
9	SYS RESET	O		
10	SYS IORD	O	SYSCON IO READ	
11	SYS IOWR	O	SYSCON IO WRITE	
12	SYS MERD	O	SYSCON MEMORY READ	
13	SYS MEWR	O	SYSCON MEMORY WRITE	
14	SYS BUSY	I	SYSCON BUSY	
15	SYS CS TC	O	SYSCON CHIP SELECT TC	
16	SYS CS REMT	O	SYSCON CHIP SELECT REMOTE	
17	REMT INT	I	REMOTE INTERRUPT	
18				
19				
20				
21	REEL RST	O	REEL RESET	
22	MCONT 7	O	MECH CONTROL 7	
23	T BAK ON	O	TAKE UP BRAKE ON	
24	CLEAN ON	O		
25	MCONT 4	O	MECH CONTROL 4	
26	MCONT 8	O	MECH CONTROL 8	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P214 C' (S7)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1		O		
2	F-SER STB +	O	FRONT SERIAL STROBE	
3	F-SER STB -	O		
4	F-SER CLK +	O	FRONT SERIAL CLOCK	
5	F-SER CLK -	O		
6	S-SER SEL 0	O	SERVO SERIAL SELECT	CPU SELECT
7	S-SER SEL 1	O		
8	CAP DIR	I	CAPSTAN DIRECTION	
9	CAP FGP	I	CAPSTAN FG PULSE	
10	CASS DET C	I	CASSETTE DETECT C	CODER 3
11	CASS IN SW R	I	CASSETTE IN SW RIGHT	
12	CASS DOWN SW	I	CASSETTE DOWN SWITCH	
13	M CASS IN	I	M CASSETTE IN	
14	REEL POS FRONT	I	REEL POSITION FRONT	
15	REEL POS CENTER	I	REEL POSITION CENTER	
16	REEL POS BACK	I	REEL POSITION BACK	
17	DEW SENS	I	DEW SENSOR	
18	EJECT KEY	I		
19	EJECT LAMP	O		
20	RF WFM SELECT 0	O		
21	RF WFM SELECT 1	O		
22	EQ FREQ CH 0	O	EQUALIZER FREQUENCY CH0	
23	EQ FREQ CH 1	O	EQUALIZER FREQUENCY CH1	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P215 A (S8)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 0	I	AV ADDRESS DATA BUS 0	
3	AV AD 3	I	AV ADDRESS DATA BUS 3	
4	AV AD 6	I	AV ADDRESS DATA BUS 6	
5	AV AB 8	I	AV ADDRESS BUS 8	
6	AV AB 11	I	AV ADDRESS BUS 11	
7	AV AB 14	I	AV ADDRESS BUS 14	
8	AV RD	I	AV READ	
9	AV RESET	I	AV RESET	
10				
11				
12	ASD 1	I	ANALOG AUDIO INPUT CH1/CH2	
13				
14	DSD 1	O	PLAYBACK DATA OUTPUT CH1/CH2	
15				
16	PBD 1 2	I	PLAYBACK DATA CH1/CH2	
17	STO	I	STATUS DATA	
18				
19				
20	MUTE 1 2	I	MUTE CH1/CH2	
21				
22	VALIDF	I	VALID FLAG	
23				
24	AU DATA IN 0	O	AUDIO REC DATA	
25	AU DATA IN 3	O	AUDIO REC DATA	
26	AU DATA IN 6	O	AUDIO REC DATA	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P216 A' (S8)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	PB RST	I	PLAYBACK RESET	
3				
4	DBCK L	I	AUDIO MASTER CLOCK LOW	
5	NC.			
6	ST 0	O	STATUS DATA 0	
7	NC.			
8	FSA	I	AUDIO SAMPLING CLOCK	
9				
10				
11				
12				
13				
14				
15				
16	NC.			
17				
18	DAI 1A	I	DIGITAL AUDIO INPUT 1A	
19	DAI 2A	I	DIGITAL AUDIO INPUT 2A	
20	DAO 1A	O	DIGITAL AUDIO OUTPUT 1A	
21	DAO 2A	O	DIGITAL AUDIO OUTPUT 2A	
22	VA CNT 1A	O	VA CONTROL 1A	
23	VA CNT 2A	O	VA CONTROL 2A	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P215 B (S8)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2	AV AD 1	I	AV ADDRESS DATA BUS 1	
3	AV AD 4	I	AV ADDRESS DATA BUS 4	
4	AV AD 7	I	AV ADDRESS DATA BUS 7	
5	AV AB 9	I	AV ADDRESS BUS 9	
6	AV AB 12	I	AV ADDRESS BUS 12	
7	AV AB 15	I	AV ADDRESS BUS 15	
8	AV WR	I	AV WRITE	
9				
10				
11				
12				
13				
14				
15	DSD L	O	PLAYBACK DATA OUTPUT L/R	
16	PBD 34	I	PLAYBACK DATA CH3/CH4	
17	STFLG	I	STATUS ERROR FLAG	
18				
19				
20	MUTE 3 4	I	MUTE CH3/CH4	
21				
22	PB5F	I	PLAYBACK LEAP FIELD	
23				
24	AU DATA IN 1	O	AUDIO REC DATA	
25	AU DATA IN 4	O	AUDIO REC DATA	
26	AU DATA IN 7	O	AUDIO REC DATA	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P216 B' (S8)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	NC.			
3				
4	DBCK	I	AUDIO MASTER CLOCK	
5	NC.			
6	ST 1	O	STATUS DATA 1	
7	FSD	O	DIGITAL IF SAMPLING CLOCK	
8				
9				
10				
11	NC.			
12				
13				
14				
15				
16	CUE D C	O	D MIX DATA COLD	
17				
18	DAI 1B	I	DIGITAL AUDIO INPUT 1B	
19	DAI 2B	I	DIGITAL AUDIO INPUT 2B	
20	DAO 1B	O	DIGITAL AUDIO OUTPUT 1B	
21	DAO 2B	O	DIGITAL AUDIO OUTPUT 2B	
22	VA CNT 1B	O	VA CONTROL 1B	
23	VA CNT 2B	O	VA CONTROL 2B	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P215 C (S8)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2	AV AD 2	I	AV ADDRESS DATA BUS 2	
3	AV AD 5	I	AV ADDRESS DATA BUS 5	
4	AV ALE	I	AV ADDRESS LOAD ENABLE	
5	AV AB 10	I	AV ADDRESS BUS 10	
6	AV AB 13	I	AV ADDRESS BUS 13	
7				
8				
9				
10				
11				
12	ASD 3	I	ANALOG AUDIO INPUT CH3/CH4	
13				
14	DSD 3	O	PLAYBACK DATA OUTPUT CH3/CH4	
15				
16				
17	BLK SYNC	I	STATUS SYNC	
18				
19				
20				
21				
22	PB FLD	I	PLAYBACK FIELD	
23				
24	AU DATA IN 2	O	AUDIO REC DATA	
25	AU DATA IN 5	O	AUDIO REC DATA	
26	AU DATA IN GND		AUDIO REC DATA GND	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P216 C' (S8)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	DIF CK	O	DIGITAL INTERFACE CLOCK	
3	DIF CK L	O	DIGITAL INTERFACE CLOCK LOW	
4				
5				
6	ST 2	O	STATUS DATA 2	
7				
8	NC.			
9	NC.			
10				
11	CUE METER	I	CUE METER	
12				
13				
14				
15				
16	CUE D H	O	D MIX DATA HOT	
17				
18	DAI 1 GND		DIGITAL AUDIO INPUT 1 GND	
19	DAI 2 GND		DIGITAL AUDIO INPUT 2 GND	
20	DAO 1 GND		DIGITAL AUDIO OUTPUT 1 GND	
21	DAO 2 GND		DIGITAL AUDIO OUTPUT 2 GND	
22	VA CNT 1 GND		VA CONTROL 1 GND	
23	VA CNT 2 GND		VA CONTROL 2 GND	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P217 A (S9)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 0		AV ADDRESS DATA BUS 0	
3	AV AD 3		AV ADDRESS DATA BUS 3	
4	AV AD 6		AV ADDRESS DATA BUS 6	
5	AV AB 8		AV ADDRESS BUS 8	
6	AV AB 11		AV ADDRESS BUS 11	
7	AV AB 14		AV ADDRESS BUS 14	
8	AV RD		AV READ	
9	AV RESET			
10				
11				
12				
13				
14				
15				
16				
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22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P218 A' (S9)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3	AV VS		AV V SYNC	
4	AV CS		AV COMPOSITE SYNC	
5	AV SC		AV SUB CARRIER	
6	AV LALT		AV ALTERNATE	
7	AV FRM		AV FRAME	
8	AV CF		AV COLOR FRAME	
9	AV HO		AV H OUT	
10	AV CLK			
11				
12	AV DATA 0			
13	AV DATA 1			
14	AV DATA 2			
15	AV DATA 3			
16	AV DATA 4			
17	AV DATA 5			
18	AV DATA 6			
19	AV DATA 7			
20				
21				
22				
23	GND (A)		GND (ANALOG CIRCUIT)	
24	+5V (A)		+5V (ANALOG CIRCUIT)	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P217 B (S9)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 1		AV ADDRESS DATA BUS 1	
3	AV AD 4		AV ADDRESS DATA BUS 4	
4	AV AD 7		AV ADDRESS DATA BUS 7	
5	AV AB 9		AV ADDRESS BUS 9	
6	AV AB 12		AV ADDRESS BUS 12	
7	AV AB 15		AV ADDRESS BUS 15	
8	AV WR		AV WRITE READ	
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P218 B' (S9)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4	AV CS L		ANALOG VIDEO COMP SYNC L	
5	AV SC L		ANALOG VIDEO SUB CARRIER L	
6				
7				
8				
9	AV HO L		AV H OUT L	
10	AV CLK L		ANALOG VIDEO CLK L	
11				
12	AV DATA 0 L			
13	AV DATA 1 L			
14	AV DATA 2 L			
15	AV DATA 3 L			
16	AV DATA 4 L			
17	AV DATA 5 L			
18	AV DATA 6 L			
19	AV DATA 7 L			
20				
21	REC INPUT VIDEO GND			
22				
23	GND (A)		GND (ANALOG CIRCUIT)	
24	+5V (A)		+5V (ANALOG CIRCUIT)	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V 9UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P217 C (S9)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 2		AV ADDRESS DATA BUS 2	
3	AV AD 5		AV ADDRESS DATA BUS 5	
4	AV ALE		AV ADDRESS LOAD ENABLE	
5	AV AB 10		AV ADDRESS BUS 10	
6	AV AB 13		AV ADDRESS BUS 13	
7				
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21				
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P218 C' (S9)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
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9				
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11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21	REC INPUT VIDEO			
22				
23	GND (A)		GND (ANALOG CIRCUIT)	
24	+5V (A)		+5V (ANALOG CIRCUIT)	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

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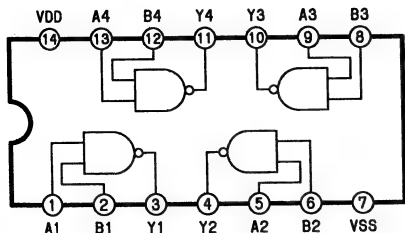
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UPD42505C-50	UPD42505C-50	48	VSI0834	EP610	17
UPD65013F101	UPD65013F101	49	VSI0836	EP610	17
UPD65022F046	UPD65022G046	48	VSI0838	EP610	17
UPD65022F210	UPD65022F210	50	VSI0839	EP610	17
UPD65042F024	UPD65042G024	48	VSI0840	EPM5032	18
UPD65061F032	UPD65061GF032	51	VSI0842	EPM5032	18
UPD71054GB	UPD71054G	54	VSI0844	EPM5032	18
UPD71055GB	UPD71055G	54	VSI0845	EPM5032	18
UPD7210C	UPD7210	63	VSI0846	PEEL18CV8	40
UPD7503GB26	UPD7503G	53	VSI0847	PEEL22CV10	41
UPD78C10CW	UPD78C10G	54	VSI0848	PEEL22CV10	41
VCR0111	VCR0111	54	VSI0849A	PEEL18CV8	40
VSI0769B	GAL6001	21	VSI0850B	GAL6001	21
VSI0770B	GAL6001	21	VSI0851	PEEL18CV8	40
VSI0771B	GAL6001	21	VSI0853B	GAL6001	21
VSI0772B	GAL6001	21	VSI0854	PEEL18CV8	40
VSI0773B	GAL6001	21	VSI0855	PEEL18CV8	40
VSI0774B	GAL6001	21	VSI0856	PEEL18CV8	40
VSI0781	GAL22V10	20	VSI0857C	GAL6001	21
VSI0782B	GAL6001	21	VSI0858C	GAL6001	21
VSI0783	GAL22V10	20	VSI0860C	GAL6001	21
VSI0784B	GAL6001	21	VSI0862B	GAL6001	21
VSI0785	GAL16V8A	19	VSI0864B	GAL6001	21
VSI0786B	GAL6001	21	VSI0866B	GAL6001	21
VSI0787	GAL16V8A	19	VSI0870	27HC256-55LC	57
VSI0788B	GAL6001	21	VSI0871	27HC256-55LC	57
VSI0789	EPS448	18	VSI0872	27HC256-55LC	57
VSI0790	EPS448	18	VSI0874	EPS448	18
VSI0793	27HC256-55LC	57	VSI0876A	EPM5032	18
VSI0794	27HC256-55LC	57	VSI0894A	EPM5032	18
VSI0795	27HC256-55LC	57	VSI0895A	EPM5032	18
VSI0796	EPM5032	18	VSI0896	EPM5032	18
VSI0799	EP610	17	VSI0897	EPM5032	18
VSI0800	EP910	17	VSI0900A	AM27C128	14
VSI0801A	EPM5032	18	VSI0903	GAL20V8A	67
VSI0803B	GAL6001	21	VSI0904	GAL20V8A	67
VSI0804	EPM5032	18	VSI0906	EPM5032	18
VSI0806	EPM5032	18	VSI0907	EPM5032	18
VSI0808	EPM5032	18	VSI0908	EPM5032	18
VSI0810	EP610	17	VSI0918A	EPM5032	18
VSI0812	EP610	17	VSI0919A	EPM5032	18
VSI0814	EP610	17	VSI0920A	EPM5032	18
VSI0816	EP610	17	VSI0921B	EPM5032	18
VSI0817	EP610	17	VSI0923	D27HC65DX30	57
VSI0818	EP610	17	VSI0925	D27HC65DX30	57
VSI0820	EP910	17	VSI0926	EP910	17
VSI0821	EP610	17	VSI0927A	EPM5032	18
VSI0823	EP610	17	VSI0928A	EPM5032	18

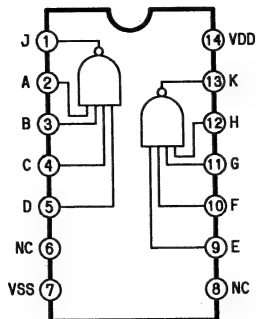
PART NO.	REF. NO.	REF. PAGE
VSI0929	EP910	17
VSI0930B	GAL6001	21
VSI0931C	EPM5032	18
VSI0933A	EPM5032	18
VSI0935A	EPM5032	18
VSI0937B	EPM5032	18
VSI0939	EPM5032	18
VSI0941B	EPM5032	18
VSI0942A	EPM5032	18
VSI0943	EPM5032	18
VSI0949	GAL6001	21
VSI0950B	GAL6001	21
VSI0952A	EP910	17
VSI0962	AM27C128	14
VSI0964E	AM27C512200D	
VSI0966B	AM27C128	14
VSI0979B	AM27C512200D	
VSI0982	EPM5032	18
VSI0983	EPM5032	18
VSI0984	EPM5032	18
VSI0985	EPM5032	18
VSI0986	EPM5032	18
VSI0987	EPM5032	18
VSI0995	EP910	17
VSI1034	AM27C040150D	
VSI1035	AM27C040150D	
VSI1038	GAL20V8A	67
	AK27CX642	56
ZR33891LC-20	ZR33891	64
ZR33891PQC-20	ZR33891	64

NOTE: The following ICs which are not described on the REF. PAGE, are not contained the IC Block drawing in this issue.

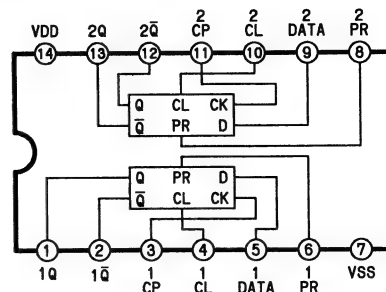
4011
(QUAD 2-INPUT NAND GATE)
(TOP VIEW)



4012
(DUAL 4-INPUT NAND GATE)
(TOP VIEW)



4013
(DUAL D-TYPE FLIP-FLOP)



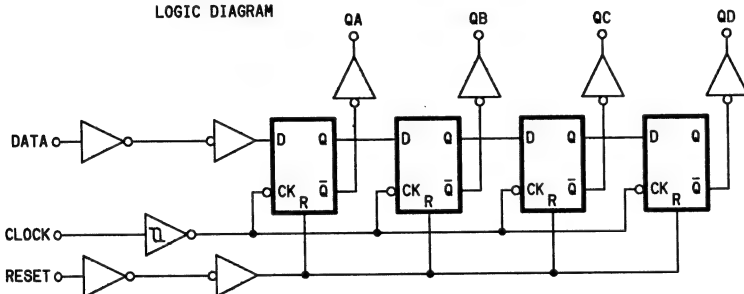
TRUTH TABLE

CLOCK \uparrow	INPUTS				OUTPUTS	
	DATA	RESET	SET		Q	\bar{Q}
	0	0	0		0	1
	1	0	0		1	0
	x	0	0		Q	\bar{Q}
x	x	1	0		0	1
x	x	0	1		1	0
x	x	1	1		1	1

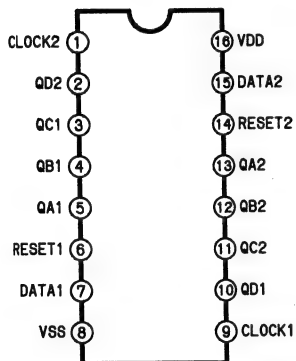
NO CHANGE

x=DON'T CARE
 \uparrow =LEVEL CHANGE

4015
(DUAL 4-STAGE SHIFT REGISTER)
LOGIC DIAGRAM



(TOP VIEW)

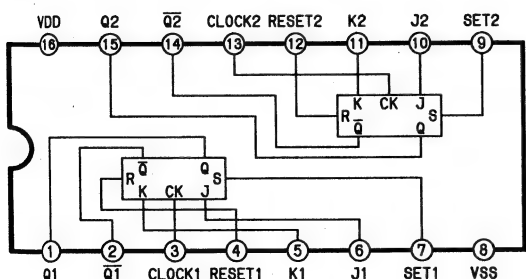


TRUTH TABLE

CL Δ	D	R	Q1	QN
	0	0	0	QN-1
	1	0	1	QN-1
	x	0	Q1	QN (NO CHANGE)
x	x	1	0	0

Δ LEVEL CHANGE
x DON'T CARE CASE

4027
(DUAL J-K MASTER-SLAVE FLIP-FLOP)
(TOP VIEW)

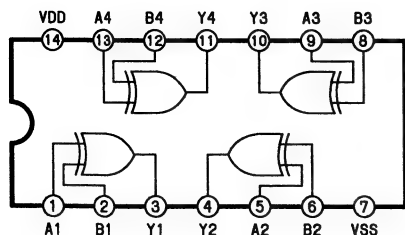


TRUTH TABLE

C	INPUT				OUTPUT	
	J	K	S	R	QN+1	$\bar{Q}N+1$
	L	L	L	L	QN	$\bar{Q}N$
	L	H	L	L	L	H
	H	L	L	L	H	L
	H	H	L	L	$\bar{Q}N$	QN
	x	x	L	L	QN	$\bar{Q}N$
x	x	x	L	H	L	H
x	x	x	H	L	H	L
x	x	x	H	H	H	H

x=DON'T CARE CASE

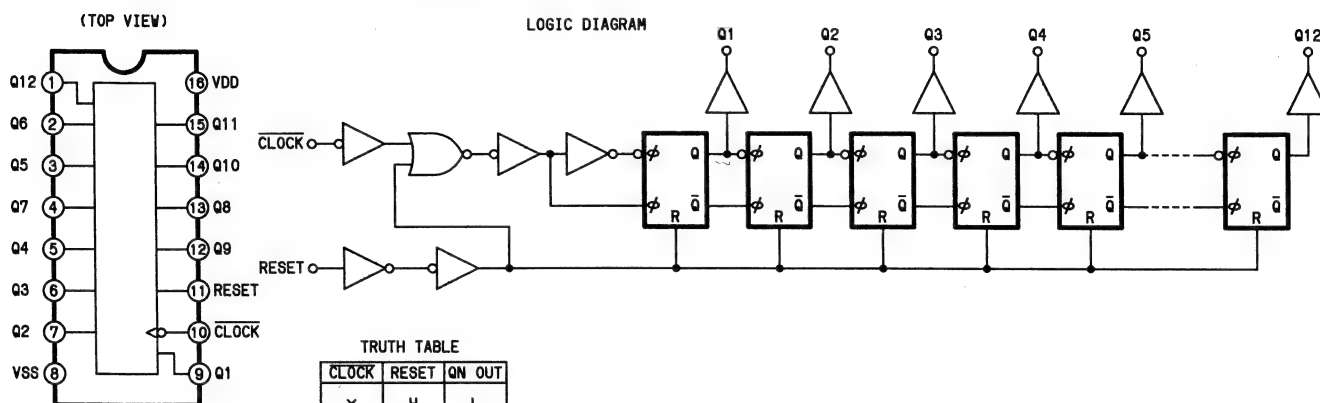
4030
(QUAD EXCLUSIVE OR GATE)
(TOP VIEW)



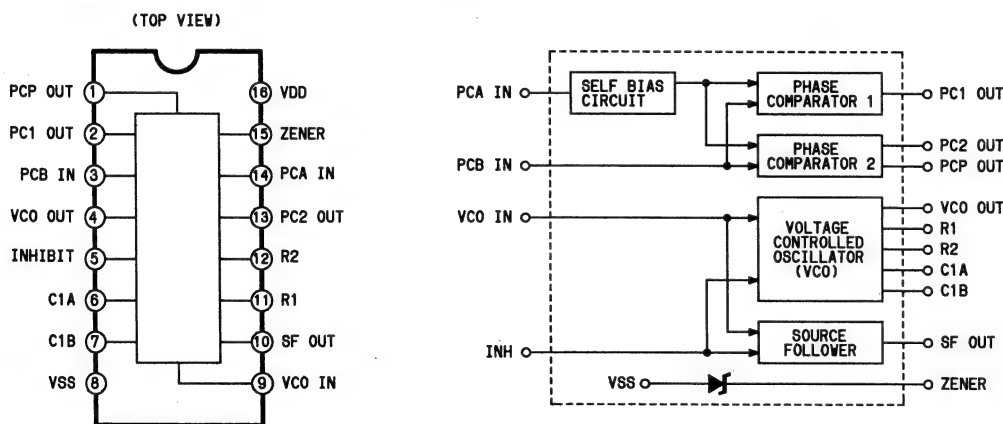
TRUTH TABLE

A	B	Y
L	L	L
H	L	H
L	H	H
H	H	L

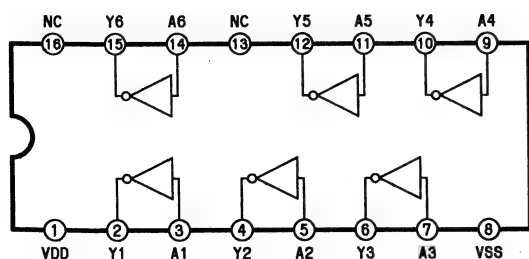
4040
(12-STAGE RIPPLE CARRY BINARY COUNTER/DIVIDER)



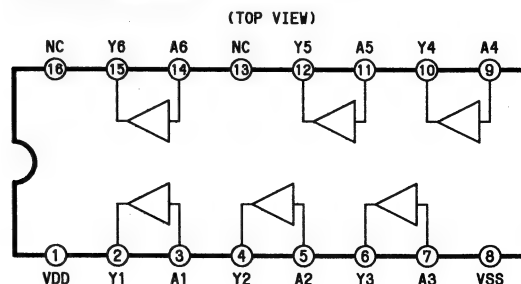
4046
(PHASE-LOCKED LOOP)



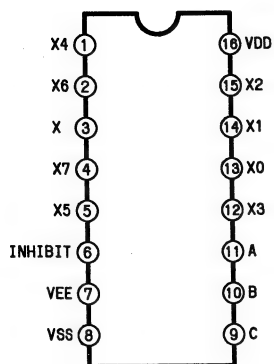
4049
(HEX. INVERTING BUFFER/CONVERTER)
(TOP VIEW)



4050
(HEX. BUFFER/CONVERTER)
(TOP VIEW)

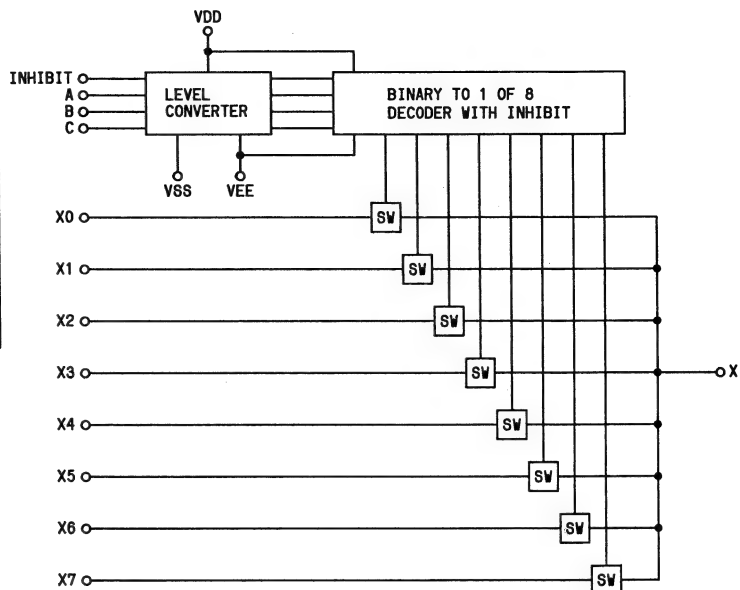


4051
(SINGLE 8-CHANNEL
MULTIPLEXER/DEMULTIPLEXER)
(TOP VIEW)

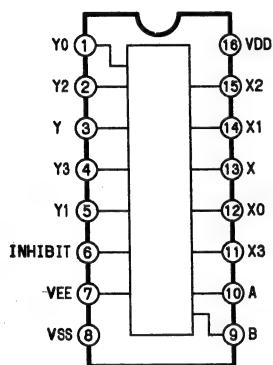


TRUTH TABLE

INPUT STATES				*ON*CHANNEL(S)
INHIBIT	C	B	A	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	X	X	X	NONE

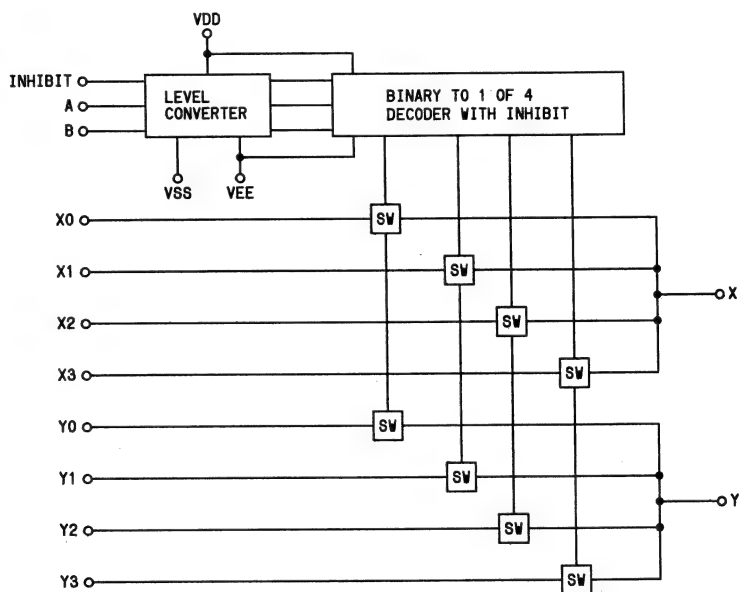


4052
(DIFFERENTIAL 4-CHANNEL
MULTIPLEXER/DEMULTIPLEXER)
(TOP VIEW)

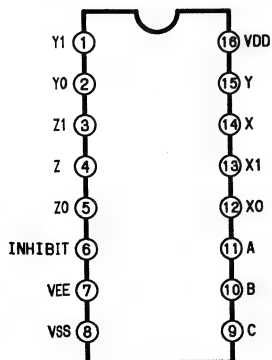


TRUTH TABLE

INPUT STATES			*ON*CHANNEL(S)
INHIBIT	B	A	
0	0	0	X0.Y0
0	0	1	X1.Y1
0	1	0	X2.Y2
0	1	1	X3.Y3
1	X	X	NONE

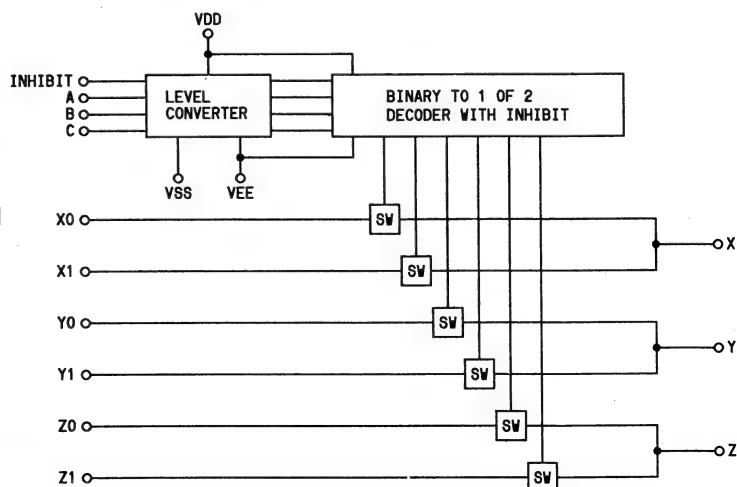


4053
(TRIPLE 2-CHANNEL
MULTIPLEXER/DEMULTIPLEXER)
(TOP VIEW)



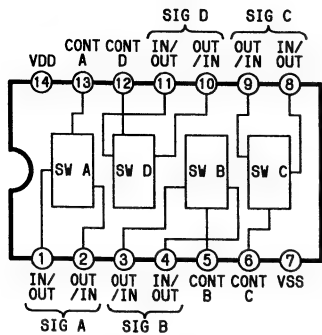
TRUTH TABLE

INPUT STATES				*ON*CHANNEL(S)
INHIBIT	C	B	A	
0	0	0	0	X0.Y0.Z0
0	0	0	1	X1.Y1.Z1
1	X	X	X	NONE



4066
(QUAD BILATERAL SWITCH)

(TOP VIEW)

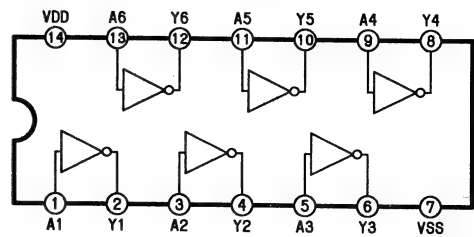


TRUTH TABLE

CONTROL	SWITCH
H	ON
L	OFF

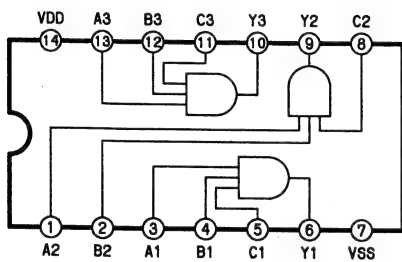
4069
(HEX. INVERTER)

(TOP VIEW)



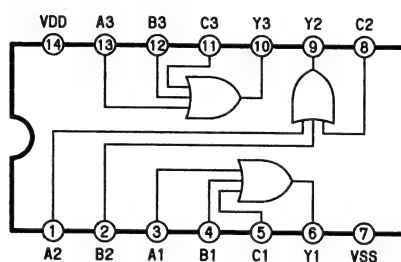
4073
(TRIPLE 3-INPUT AND GATE)

(TOP VIEW)



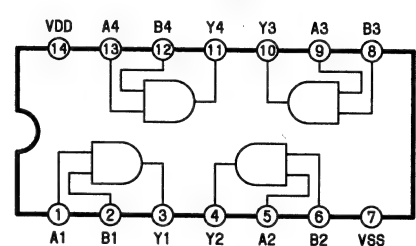
4075
(TRIPLE 3-INPUT OR GATE)

(TOP VIEW)



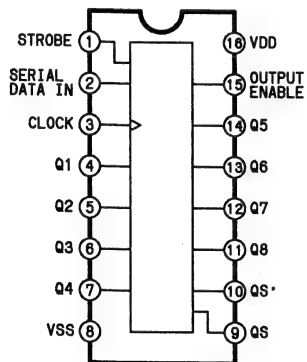
4081
(QUAD 2-INPUT AND GATE)

(TOP VIEW)



4094
(8-STAGE SHIFT/STORE BUS REGISTER)

(TOP VIEW)



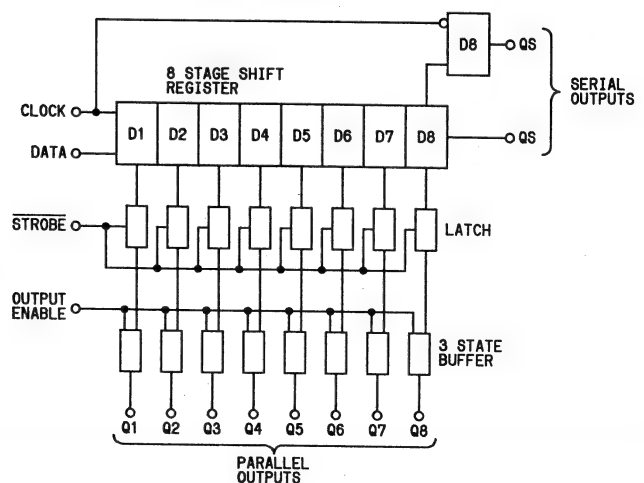
TRUTH TABLE

CL ▲	OUTPUT ENABLE	STROBE	DATA	PARALLEL OUTPUTS		SERIAL OUTPUTS	
				Q1	Q _N	Q _S	Q'S
0	0	x	x	0C	0C	Q7	NC
0	x	x	x	0C	0C	NC	Q7
1	0	x	x	NC	NC	Q7	NC
1	1	0	0	0	Q _N -1	Q7	NC
1	1	1	1	1	Q _N -1	Q7	NC
1	1	1	1	NC	NC	NC	Q7

▲-LEVEL CHANGE

x-DON'T CARE CASE

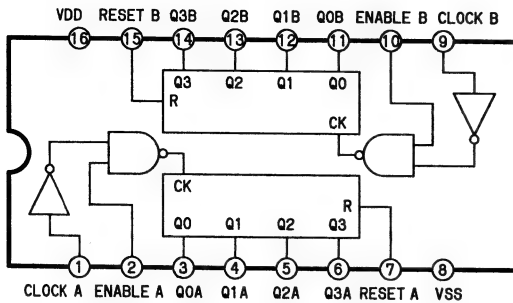
BLOCK DIAGRAM



4520

(DUAL BINARY UP COUNTER)

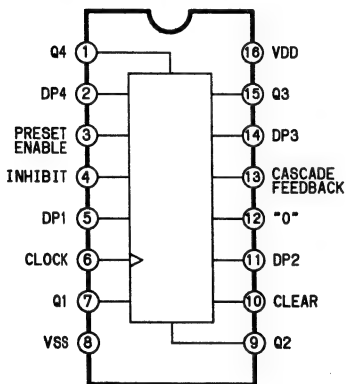
(TOP VIEW)



4526

(PROGRAMMABLE
DIVIDE-BY-N 4-BIT COUNTER)

(TOP VIEW)

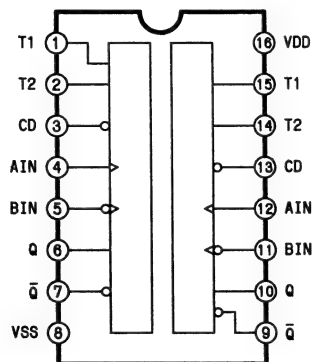


CLOCK	INHIBIT	PRESET ENABLE	MASTER RESET	ACTION
0	0	0	0	NO COUNT
	0	0	0	COUNT1
X	1	0	0	NO COUNT
1		0	0	COUNT1
X	X	1	0	PRESET
X	X	X	1	RESET

4528

(DUAL MONOSTABLE MULTIVIBRATOR)

(TOP VIEW)



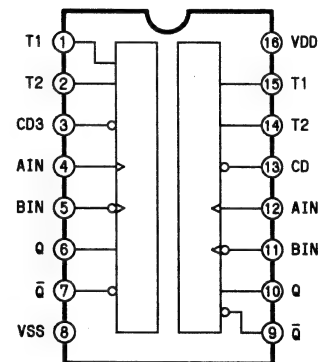
TRUTH TABLE

INPUT			OUTPUT	
A	B	CD	Q	Q̄
	H	H		
	L	H	Q	Q̄
H		H	Q	Q̄
L		H		
X	X	L	L	H

4538

(DUAL PRECISION
MONOSTABLE MULTIVIBRATOR)

(TOP VIEW)



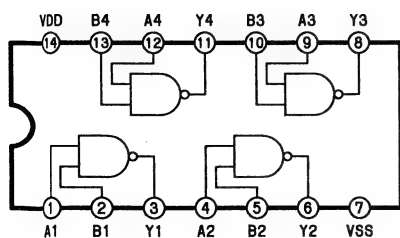
TRUTH TABLE

INPUT			OUTPUT	
A	B	CD	Q	Q̄
	H	H		
	L	H	Q	Q̄
H		H	Q	Q̄
L		H		
X	X	L	L	H

7400

(QUAD 2-INPUT NAND GATE)

(TOP VIEW)



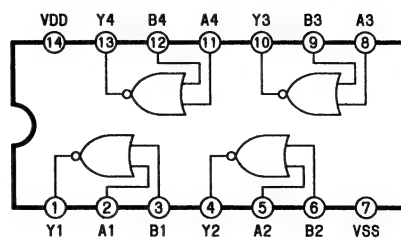
TRUTH TABLE (74HC)

INPUTS		OUTPUTS
A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

7402

(QUAD 2-INPUT NOR GATE)

(TOP VIEW)

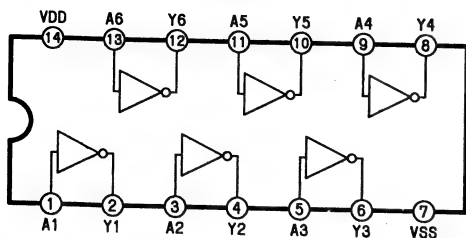


TRUTH TABLE

INPUTS		OUTPUTS
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

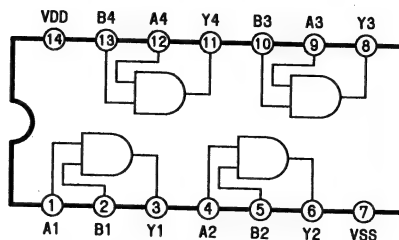
7404
(HEX. INVERTER)

(TOP VIEW)



7408
(QUAD 2-INPUT AND GATE)

(TOP VIEW)

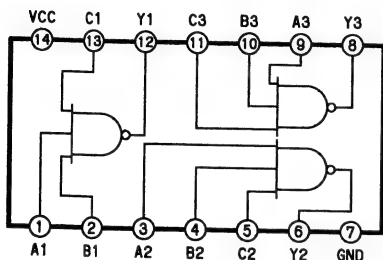


TRUTH TABLE

INPUTS		OUTPUTS
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

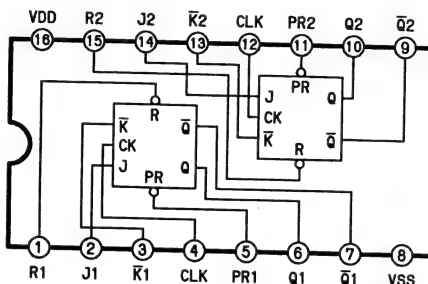
7410
(TRIPLE 3-INPUT POSITIVE-NAND GATES)

(TOP VIEW)



POSITIVE LOGIC:
Y=ABC

74109
(DUAL J-K FLIP-FLOP WITH PRESET AND CLEAR)



CLK: CLOCK
PR: PRESET
R: RESET

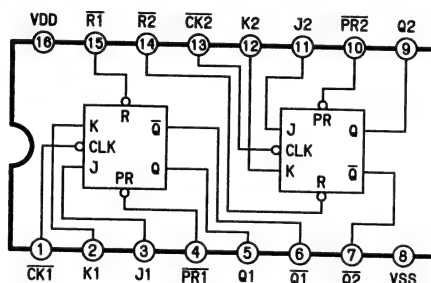
TRUTH TABLE (74HC109)

INPUTS					OUTPUTS	
PR	CLR	CLK	J	K	Q	Q-bar
L	H	x	x	x	H	L
H	L	x	x	x	L	H
L	L	x	x	x	H*	H*
H	H	↑	L	L	L	H
H	H	↑	H	L	TOGGLE	
H	H	↑	L	H	Q0	Q0-bar
H	H	↑	H	H	H	L
H	H	L	x	x	Q0	Q0-bar

*: UNSTABLE

74112
(DUAL J-K FLIP-FLOP WITH PRESET AND CLEAR)

(TOP VIEW)



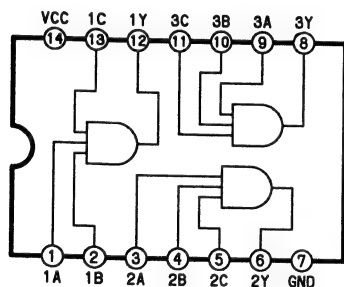
CLK: CLOCK
PR: PRESET
R: RESET

TRUTH TABLE (74HC112)

INPUTS					OUTPUTS	
PR	CLR	CLK	J	L	Q	Q-bar
L	H	x	x	x	H	L
H	L	x	x	x	L	H
L	L	x	x	x	L*	L*
H	H	↓	L	L	Q0	Q0-bar
H	H	↓	L	H	L	H
H	H	↓	H	H	TOGGLE	
H	H	H	x	x	Q0	Q0-bar

*: UNSTABLE

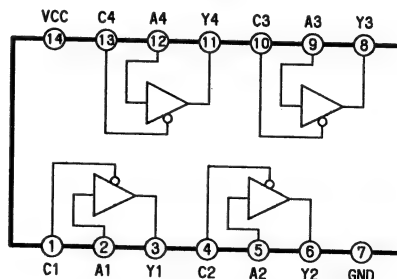
7411
(TRIPLE 3-INPUT AND GATE)



Y=A.B.C

74125
(3 STATE QUAD BUFFER)

(TOP VIEW)

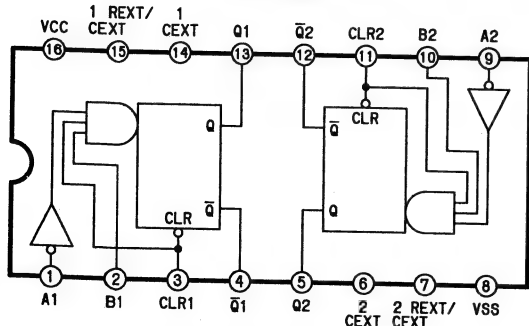


TRUTH TABLE

INPUTS		OUTPUT
A	C	Y
H	L	H
L	L	L
X	H	Z

74123
(DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR)

(TOP VIEW)

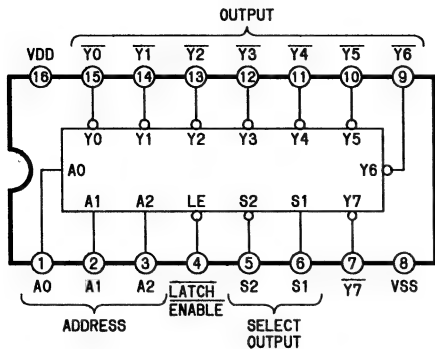


TRUTH TABLE

INPUTS			OUTPUTS	
CLR	A	B	Q	Q-bar
L	x	x	L	H
x	H	x	L	H
x	x	L	L	H
H	↑	H	↑	↓
H	↓	H	↓	↑

(3-8 LINE DECODERS)

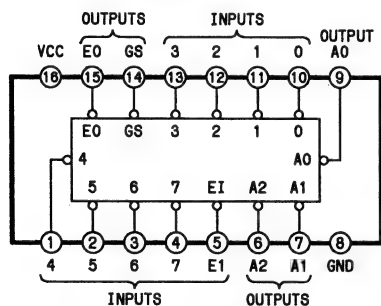
OUTPUT



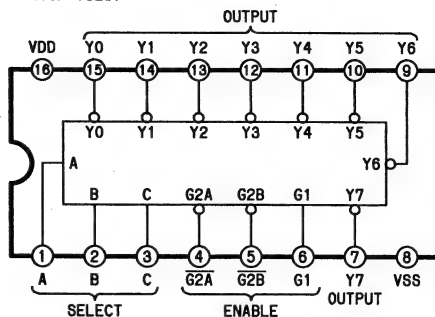
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[illegible]

•DEW TO ADDRESS CONDITION OF LATCH ENABLE

[illegible][illegible][illegible]

(TOP VIEW)

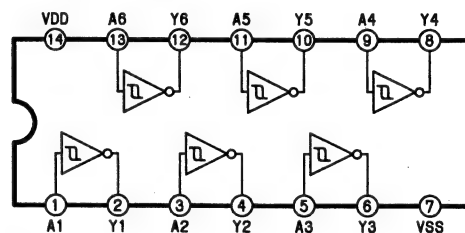


INPUTS	
--------	--

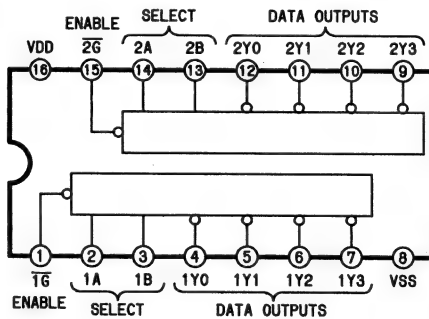
INPUTS				OUTPUTS							
ENABLE		SELECT		Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
G1	G ₂ *	C	B A								
X	H	x	x x	H	H	H	H	H	H	H	H
L	x	x	x x	H	H	H	H	H	H	H	H
H	L	L	L L	L	H	H	H	H	H	H	H
H	L	L	L H	H	L	H	H	H	H	H	H
H	L	L	H L	H	H	L	H	H	H	H	H
H	L	L	H H	H	H	H	L	H	H	H	H
H	L	H	L L	H	H	H	L	H	H	H	H
H	L	H	L H	H	H	H	H	L	H	H	H
H	L	H	H L	H	H	H	H	H	L	H	H
H	L	H	H H	H	H	H	H	H	H	L	H

1000

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26



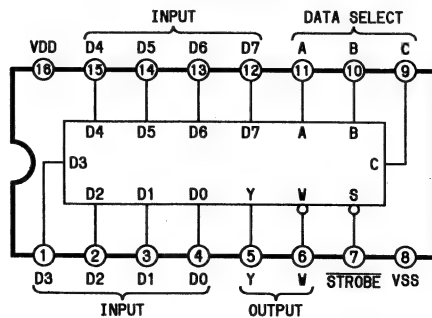
SELECT



INPUT

INPUTS			OUTPUTS			
ENABLE	SELECT		Y0	Y1	Y2	Y3
G	B	A				
H	X	X	H	H	H	H
L	X	L	L	H	H	H
L	L	H	H	L	H	H
L	H	L	H	H	L	H
L	H	H	H	H	H	L

INPUT

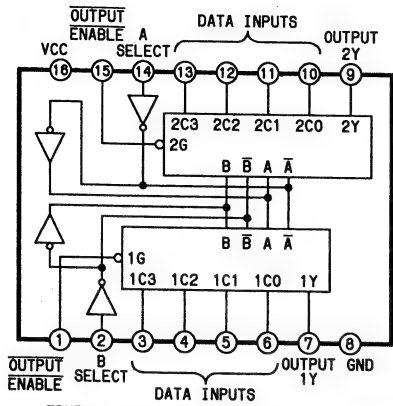


INPUT

INPUTS				OUTPUTS	
SELECT			STROBE	Y	W
C	B	A	S		
X	X	X	H	L	H
L	L	L	L	D0	D0
L	L	H	L	D1	D1
L	H	L	L	D2	D2
L	H	H	L	D3	D3
H	L	L	L	D4	D4
H	L	H	L	D5	D5
H	H	L	L	D6	D6
H	H	H	L	D7	D7

74153

(DUAL 4 TO 1 DATA SELECTORS)
(TOP VIEW)



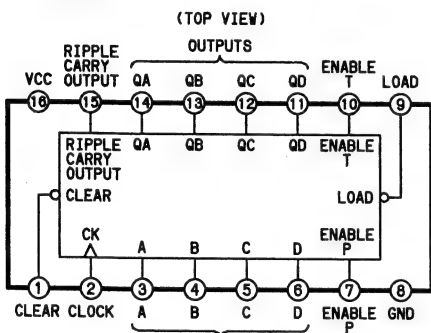
TRUTH TABLE

INPUT		OUTPUT	
SELECT	ENABLE	Y	Z
B	A	Y	Z
X	X	H	L
L	L	L	C0
L	H	L	C1
H	L	L	C2
H	H	L	C3

H:HIGH L:LOW X:H or L

74163

(4-BIT SYNCHRONOUS BINARY COUNTER WITH SYNCHRONOUS CLEAR)

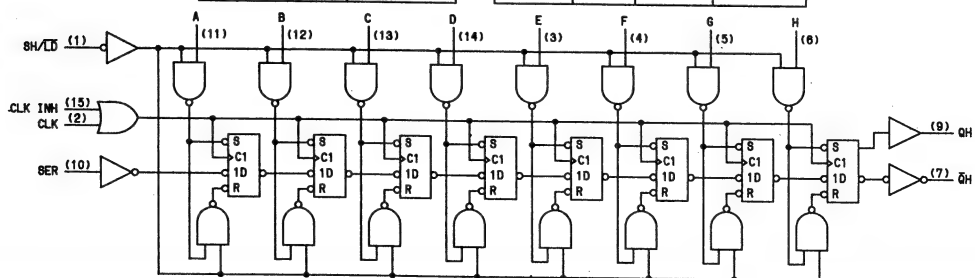
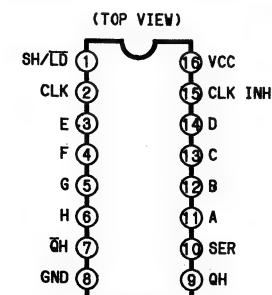


TRUTH TABLE

CLK	CLR	ENP	ENT	LOAD	FUNCTION
↑	L	X	X	X	CLEAR
X	H	H	L	H	COUNT & RC DISABLED
X	H	L	H	H	COUNT DISABLED
X	H	L	L	H	COUNT & RC DISABLED
↑	H	X	X	L	LOAD
↑	H	H	H	H	INCREMENT COUNTER

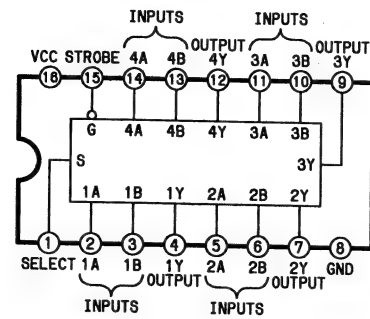
74165

(PARALLEL-LOAD 8-BIT SHIFT REGISTERS)



74157, 74158

(QUAD 2-INPUT MULTIPLEXER)
(TOP VIEW)

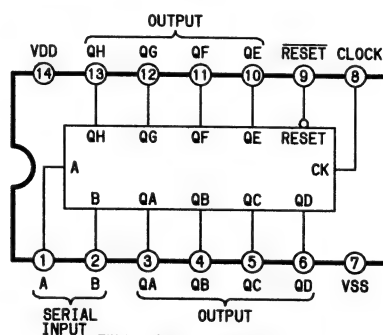


TRUTH TABLE (74HC157)

INPUTS		OUTPUT Y	
STROBE	SELECT	HC157	HC158
H	X	X	X
L	L	L	L
L	H	H	H
L	L	X	L
L	H	X	H

74164

(8-BIT SERIAL-IN/PARALLEL-OUT SHIFT REGISTER)
(TOP VIEW)



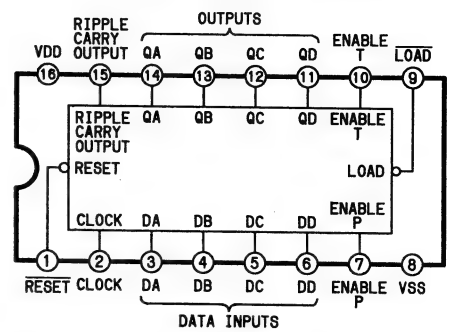
TRUTH TABLE (74HC164)

INPUT		OUTPUT	
RESET	CLOCK	A	B
L	X	X	X
H	↑	X	X
H	↑	L	X
H	↑	X	L
H	↑	H	H

H:HIGH L:LOW X:H or L

74161

(4-BIT SYNCHRONOUS BINARY COUNTER)
(TOP VIEW)



TRUTH TABLE (74HC160/74HC161)

INPUT					OUTPUT
CLOCK	RESET	LOAD	ENABLE P	ENABLE T	Qn
X	L	X	X	X	L
↑	H	L	X	X	LOAD
↑	H	H	H	H	COUNT
X	H	H	L	X	NO COUNT
X	H	H	X	L	NO COUNT

H:HIGH L:LOW X:H or L
n:A~D

FUNCTION TABLE (74161)

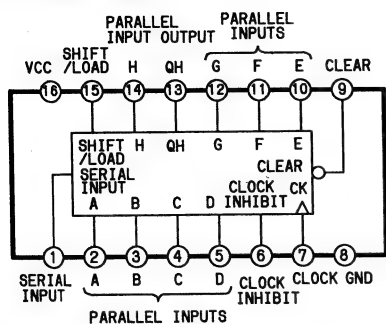
INPUT		OUTPUT		FUNCTION	
CLEAR	LOAD	CK	ENABLE P T	QA QB QC QD	RIPPLE CARRY
H	H	↑	H H	DA DB DC DD	—
H	L	X	X X	L L L L	—
↑	X	X X	X X	H H H H	—

FUNCTION TABLE

INPUT		FUNCTION
SHIFT/LOAD	CK CK INHIBIT	
H	↑	RIGHT SHIFT
↑	X	DATA SET
H	X	HOLD

74166

(8-BIT SHIFT REGISTER)



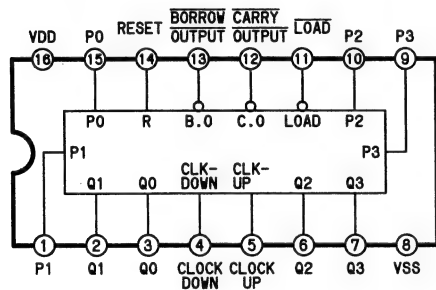
TRUTH TABLE

INPUT				FUNCTION
CLEAR	SHIFT/LOAD	CK	CK INHIBIT	
H	H		L	RIGHT SHIFT
H	L		L	LOAD
H	H	X	H	HOLD
	X	X	X	CLEAR

74193

(4-BIT SYNCHRONOUS BINARY UP/DOWN COUNTER)

(TOP VIEW)



P0~P3 PRESET INPUT
Q0~Q3 BINARY OUTPUT

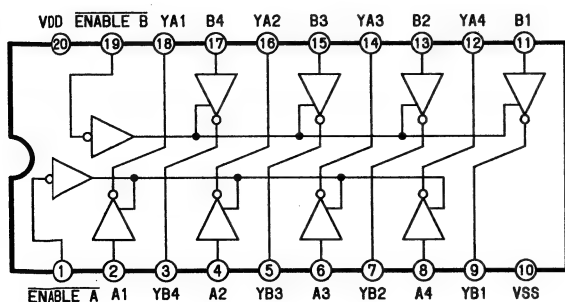
TRUTH TABLE

COUNT		CLEAR	LOAD	FUNCTION
UP	DOWN			
↑	H	L	H	COUNT UP
H	↑	L	H	COUNT DOWN
X	X	H	X	CLEAR
X	X	L	L	LOAD

74240

(INVERTING OCTAL 3-STATE BUFFER)

(TOP VIEW)



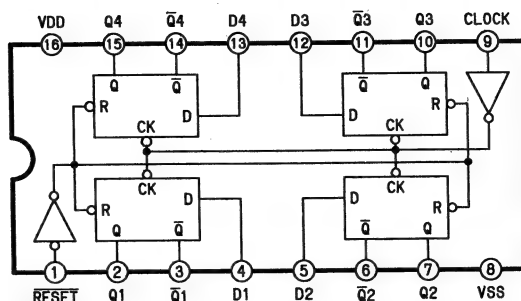
TRUTH TABLE (74HC240)

1G	1A	1Y	2G	2A	2Y
L	L	H	L	L	H
L	H	L	L	H	L
H	L	Z	H	L	Z
H	H	Z	H	H	Z

74175

(QUAD D-TYPE FLIP-FLOP WITH CLEAR)

(TOP VIEW)



TRUTH TABLE (74HC175)

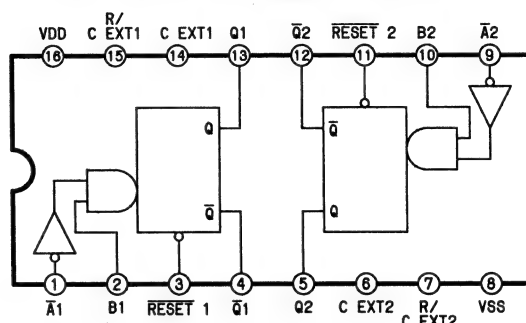
INPUT			OUTPUT	
CLOCK	RESET	D	Q	Q̄
X	L	X	L	H
	H	H	H	L
	H	L	L	H
L	H	X	NO CHANGE	

H:HIGH L:LOW X:H or L

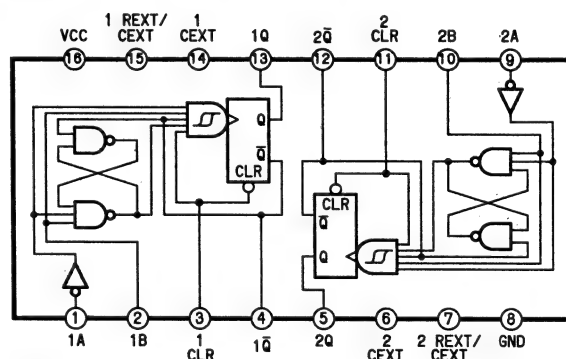
74221

(DUAL NON-RETRIGGERABLE MONOSTABLE MULTIVIBRATOR)

(TOP VIEW)



(74HC221)



(74221)

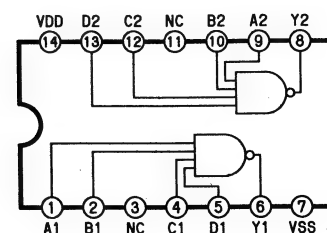
TRUTH TABLE (74HC221)

INPUTS		OUTPUTS	
CLEAR	A	Q	Q̄
L	X	X	H
X	H	X	L
X	X	L	H
H	L	↑	↓
H	↓	↓	↑
↑	L	H	↓

7420

(DUAL 4-INPUT NAND GATE)

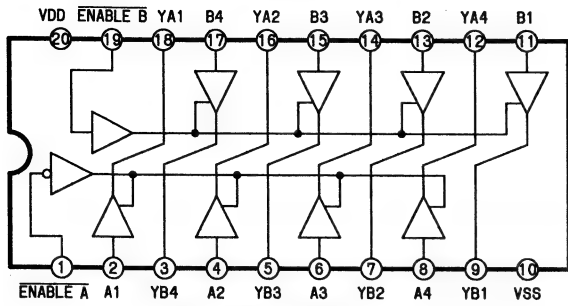
(TOP VIEW)



74241

(INVERTING OCTAL 3-STATE BUFFER)

(TOP VIEW)

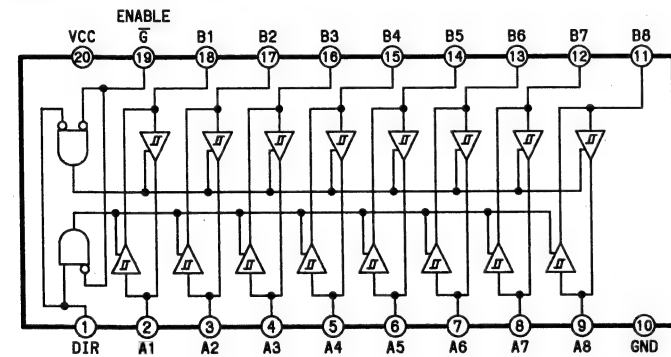


TRUTH TABLE (74HC241)

1G	1A	1Y	2G	2A	2Y
L	L	L	H	L	L
L	H	H	H	H	H
H	L	Z	L	L	Z
H	H	Z	L	H	Z

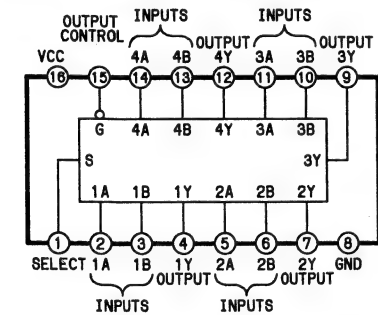
74245

(OCTAL 3-STATE BUS TRANSCEIVERS)



74257

(QUAD 2-CHANNEL 3-STATE MULTIPLEXER)



FUNCTION TABLE (74257)

INPUTS		OUTPUT Y
SELECT	OUTPUT CONTROL	
X	H	Z
L	L	A
H	L	B

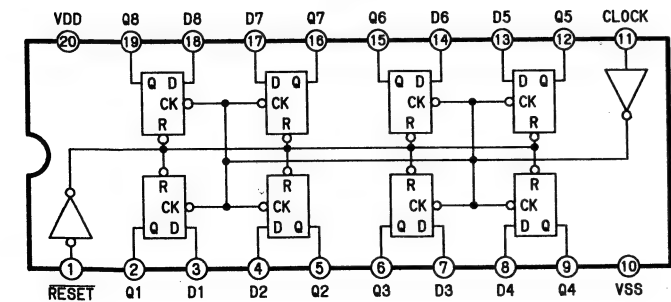
TRUTH TABLE (74HC257)

INPUTS		OUTPUT Y
OUTPUT CONTROL	SELECT	
H	X	X
L	L	L
L	H	H
L	L	X
L	H	X

74273

(OCTAL D-TYPE FLIP-FLOP WITH CLEAR)

(TOP VIEW)



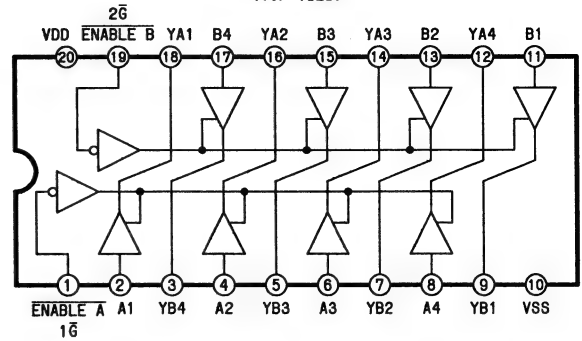
TRUTH TABLE (74HC273)

INPUTS			OUTPUTS
CLEAR	CLOCK	D	
L	X	X	L
H	↑	H	H
H	↑	L	L
H	L	X	Q0

74244

(OCTAL 3-STATE BUFFER)

(TOP VIEW)

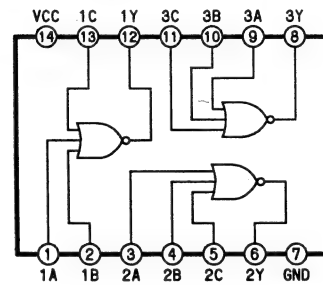


TRUTH TABLE (74HC244)

1G	1A	1Y	2G	2A	2Y
L	L	L	L	L	L
L	H	H	L	H	H
H	L	Z	H	L	Z
H	H	Z	H	H	Z

7427

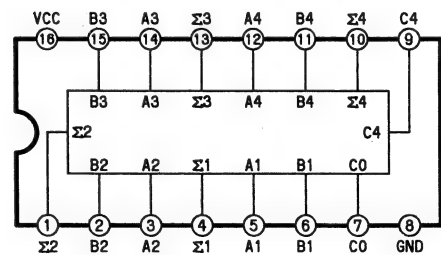
(TRIPLE 3-INPUT NOR GATE)



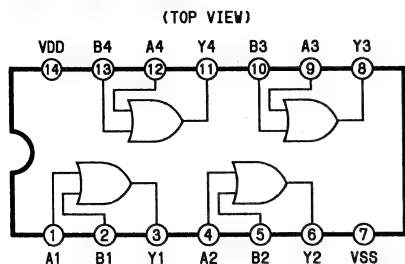
74283

(4-BIT BINARY ADDER WITH FAST CARRY)

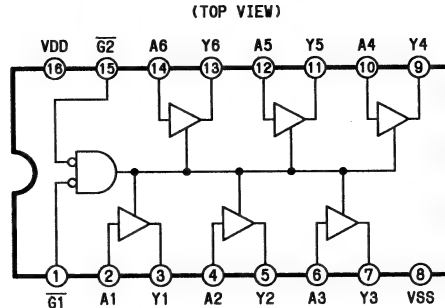
(TOP VIEW)



7432
(QUAD 2-INPUT OR GATE)



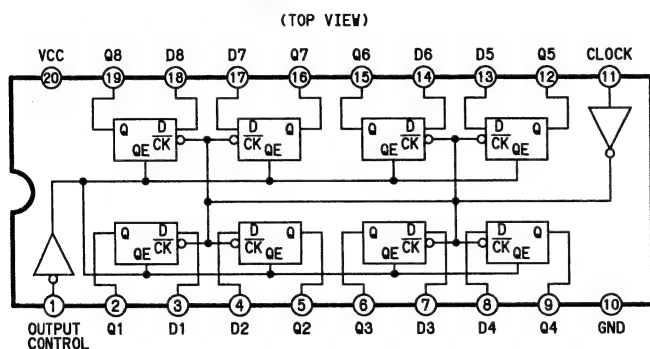
74365
(HEX. 3-STATE BUFFER)



TRUTH TABLE (74HC365)

INPUTS			OUTPUT
G1	G2	A	Y
H	x	x	Z
x	H	x	Z
L	L	H	H
L	L	L	L

74374
(3-STATE OCTAL D-TYPE FLIP-FLOP)



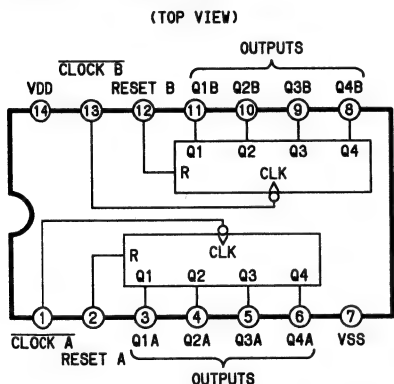
TRUTH TABLE (74HC374)

OUTPUT CONTROL	CLOCK	DATA	OUTPUT
L	↑	H	H
L	↑	L	L
L	x	x	Q0
H	x	x	Z

FUNCTION TABLE (74374)

INPUT		FUNCTION
OUTPUT CTL	CK	
x	↑	DATA SET
H	x	HIGH IMPE OUT

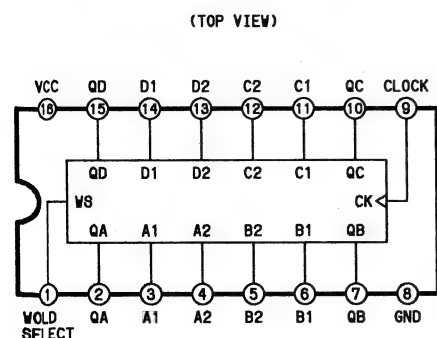
74393
(DUAL 4-BIT BINARY COUNTER)



TRUTH TABLE (74HC393)

INPUTS		FUNCTION
CLOCK	CLEAR	
↓	L	INCREMENT
x	H	CLEAR

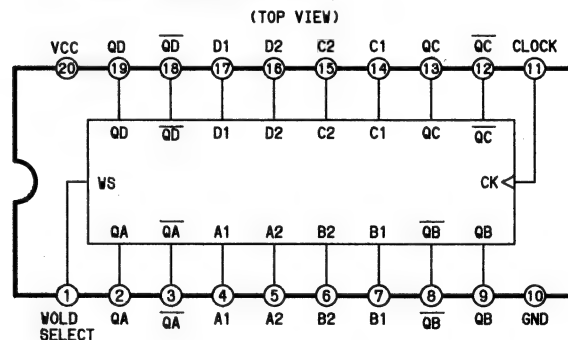
74399
(4-BIT 2 INPUT MULTIPLEX REGISTER)



TRUTH TABLE

INPUT		OUTPUT			
WOLD SELECT	CK	QA	QB	QC	QD
L	↑	DA1	DB1	DC1	DD1
H	↑	DA2	DB2	DC2	DD2

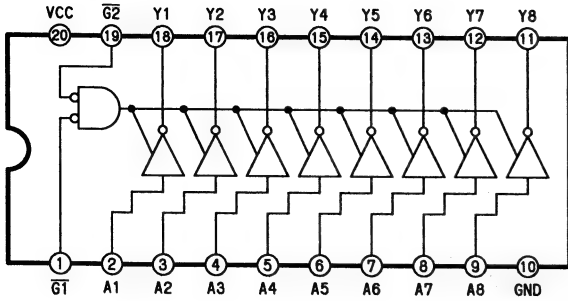
74398
(4-BIT 2 INPUT MULTIPLEX REGISTER)



TRUTH TABLE

INPUT		OUTPUT			
WOLD SELECT	CK	QA	QB	QC	QD
L	↑	DA1	DB1	DC1	DD1
H	↑	DA2	DB2	DC2	DD2

74540
(INVERTING OCTAL 3-STATE BUFFER)

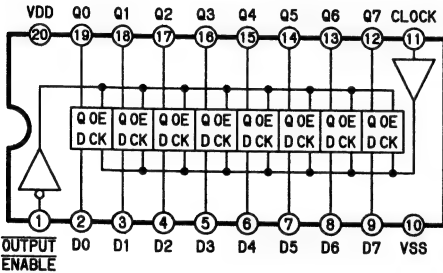


TRUTH TABLE

INPUT		OUTPUT
E1	E2	
L	L	D
H	X	HIGH Z
X	H	HIGH Z

74574
(OCTAL D-TYPE FLIP-FLOP)

(TOP VIEW)



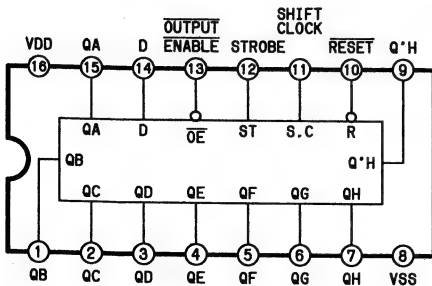
TRUTH TABLE (74HC574)

INPUT			OUTPUT
OUTPUT ENABLE	CLOCK	DATA D	Q
L	↗	H	H
L	↘	L	L
L	↗	X	NO CHANGE
H	X	X	Z

X:H or L Z:HIGH IMPEDANCE

74595
(8-BIT SHIFT REGISTER WITH OUTPUT LATCH)

(TOP VIEW)



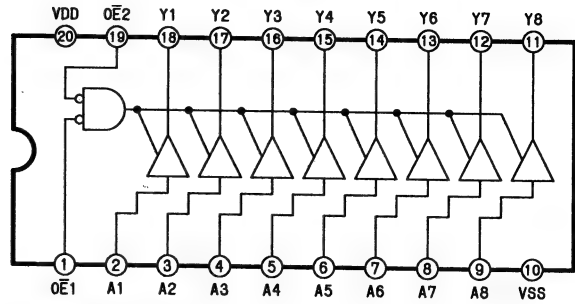
QA~QH:PARALLEL OUTPUTS
Q'H:SERIAL OUTPUT

TRUTH TABLE (74HC595)

RCK	SCK	SCLR	Q	FUNCTION
X	X	X	1	QA THRU QH-TRI-STATE
X	X	L	X	SHIFT REGISTER CLEARED QH'-0
X	↑	H	X	SHIFT REGISTER CLOCKED QN-Qn-1.Q0-SER
↑	X	H	X	CONTENTS OF SHIFT REGISTER TRANSFERRED TO OUTPUT LATCHES

74541
(OCTAL 3-STATE BUFFER)

(TOP VIEW)



OE1.OE2:OUTPUT ENABLE

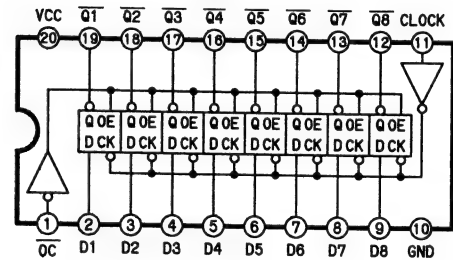
TRUTH TABLE

INPUT		OUTPUT	
OE1	OE2	A	Y
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

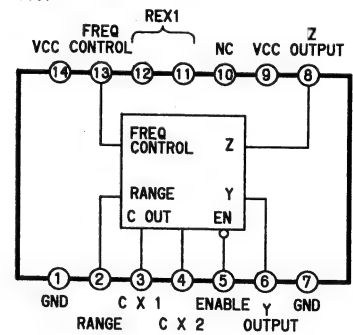
X:H or L Z:HIGH IMPEDANCE

74576
(OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH INVERTED OUTPUTS)

(TOP VIEW)

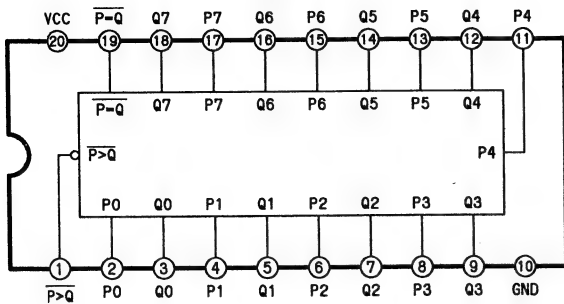


74628
(VCO)



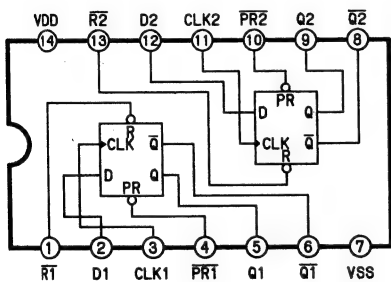
74682
74684
(8-BIT MAGNITUDE COMPARATORS)

(TOP VIEW)



7474
(DUAL D-TYPE FLIP-FLOP)

(TOP VIEW)



CLK: CLOCK

PR: PRESET

R: RESET

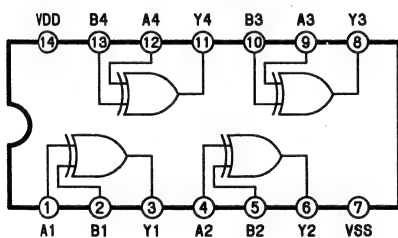
D: DATA

TRUTH TABLE (74HC74)						
INPUTS				OUTPUTS		
PR	CLR	CLK	D	Q	Q	
L	H	x	x	H	L	L
H	L	x	x	L	H	H
L	L	x	x	H*	H*	H*
H	H	↑	H	H	L	L
H	H	↑	L	L	H	H
H	H	L	x	Q0	Q0	

*: UNSTABLE

7486
(QUAD EXCLUSIVE OR GATE)

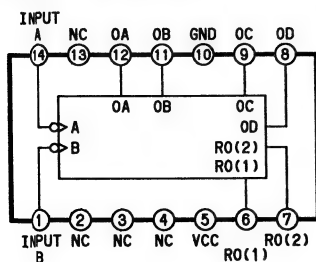
(TOP VIEW)



TRUTH TABLE		
INPUTS	OUTPUTS	
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

$$Y = A \oplus B = \bar{A}B + A\bar{B}$$

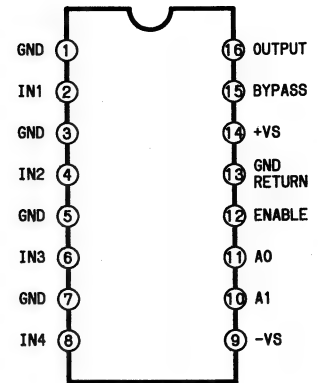
7492
(DIVIDE BY TWELVE COUNTER)



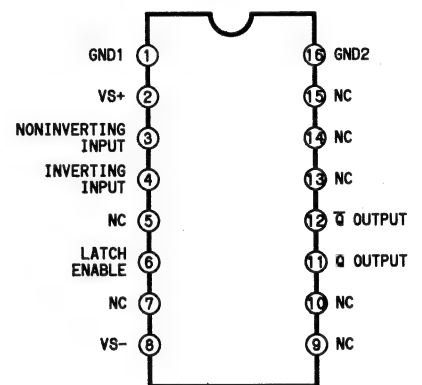
FUNCTION TABLE						
INPUT				OUTPUT		
RO	CK	A	B	QA	QB	QC
L	PULS	0	L	L	L	L
		1	H	H	L	L
		2	L	L	H	L
		3	L	L	L	H
		4	H	L	H	H
		5	L	H	H	H
		6	L	L	L	L
H	x	x	—	L	L	L

RO=RO(1).RO(2)

AD9300 (SELECT SWITCH)
(TOP VIEW)

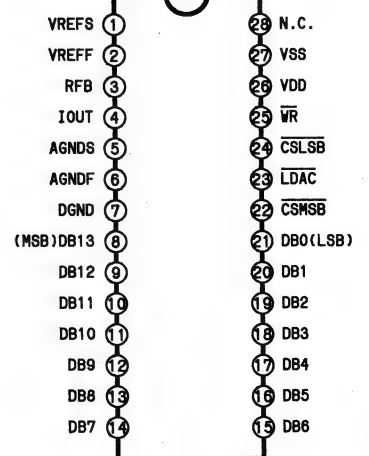


AD96685 (COMPARATOR)
(TOP VIEW)



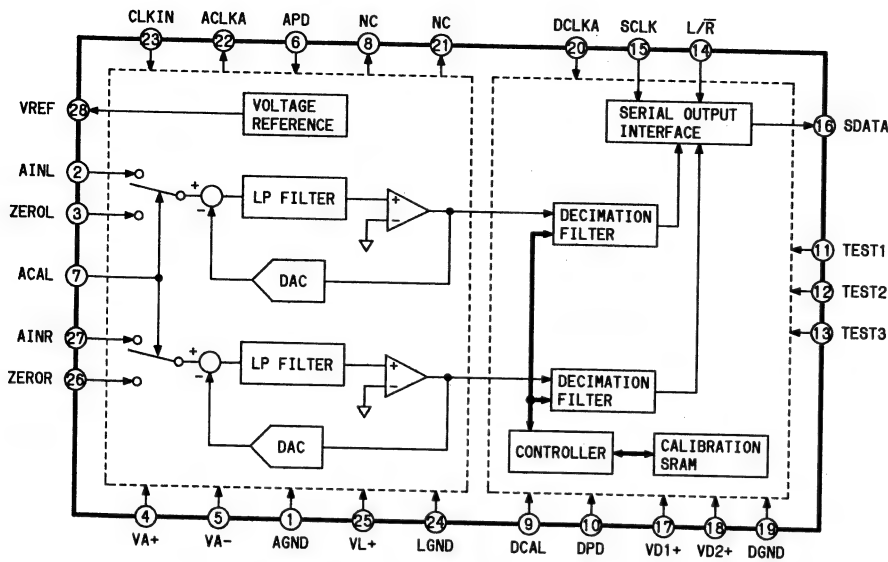
AD7535
(TIMING CHARACTERISTICS)

(TOP VIEW)



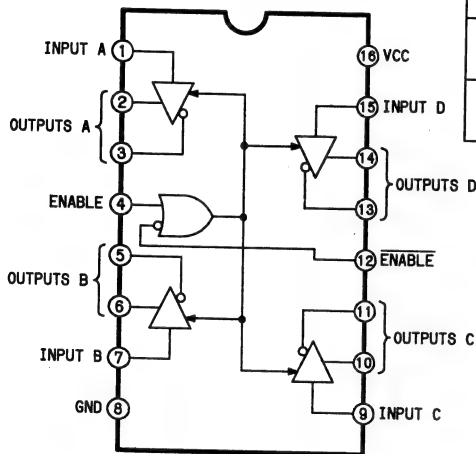
AK5326

(HIGH PERFORMANCE STEREO A/D CONVERTER)



AM26LS31PC

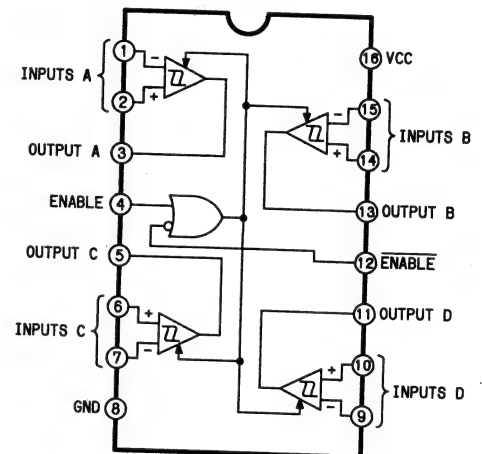
(QUAD DIFF LINE(RS422)DRIVER)



TRUTH TABLE			
IN	CONTROL (E/E)	NON-INVERTING OUTPUT	INVERTING OUTPUT
H	H/L	H	L
L	H/L	L	H
X	L/H	Z	Z

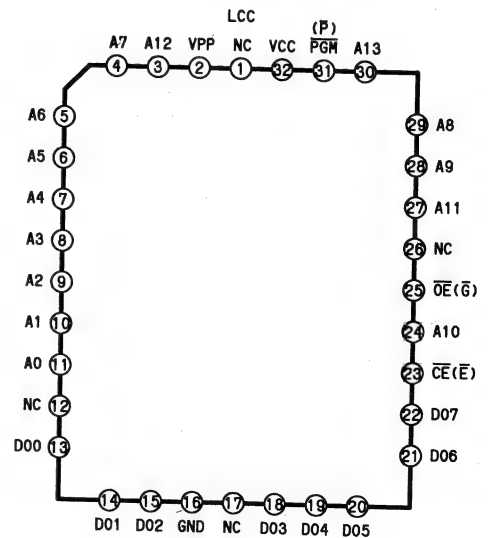
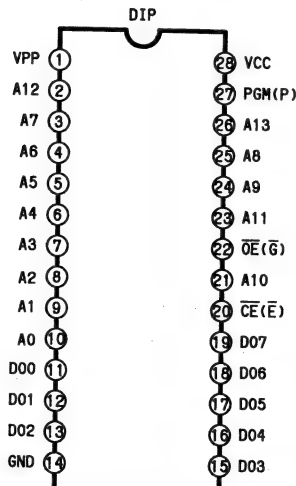
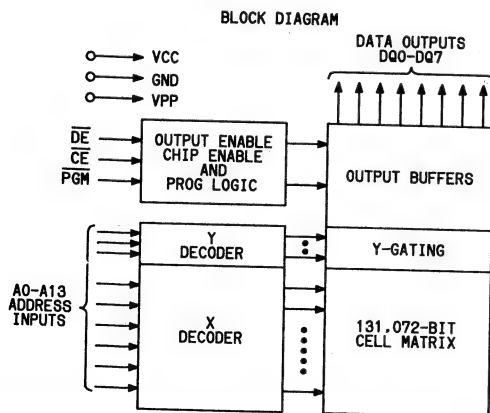
AM26LS32PC

(QUAD DIFF LINE(RS422/423)RECEIVER)

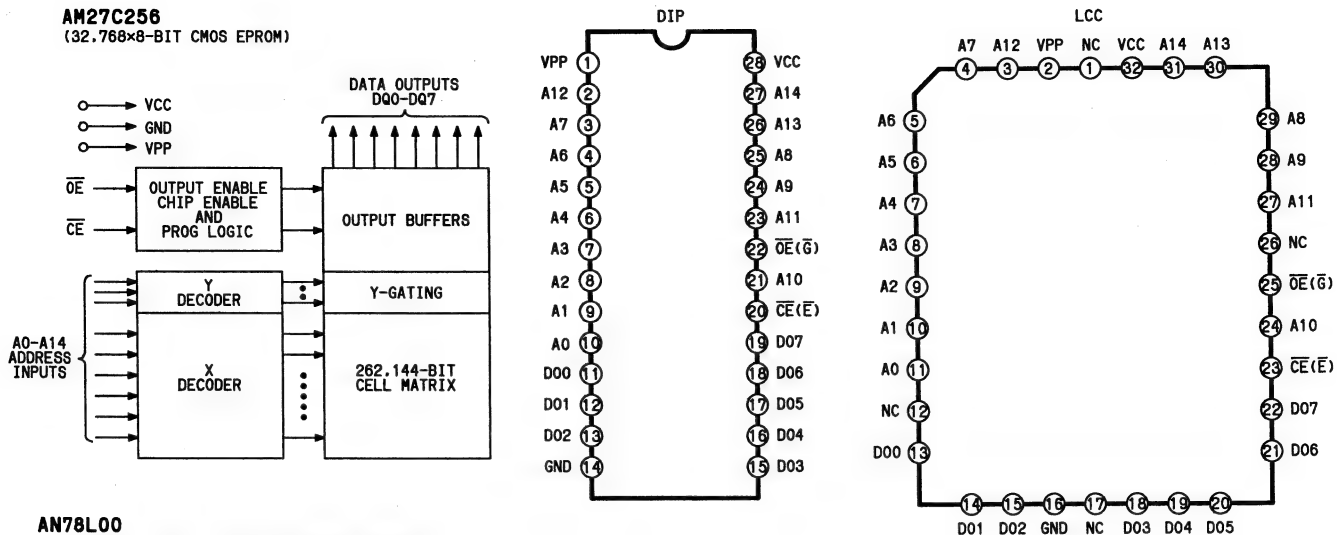


AM27C128

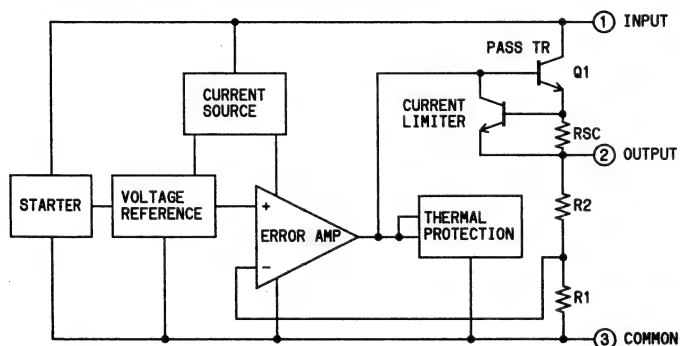
(16,384x8-BIT CMOS EPROM)



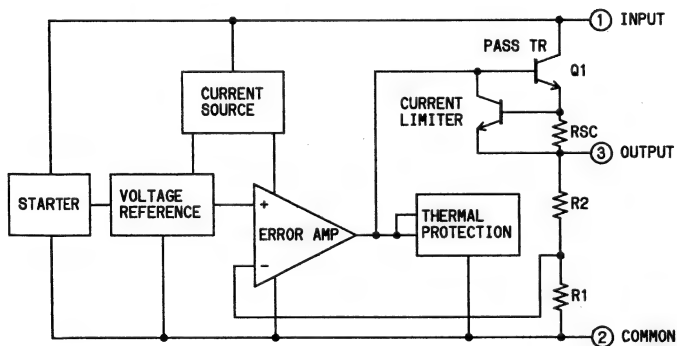
AM27C256
(32,768x8-BIT CMOS EPROM)



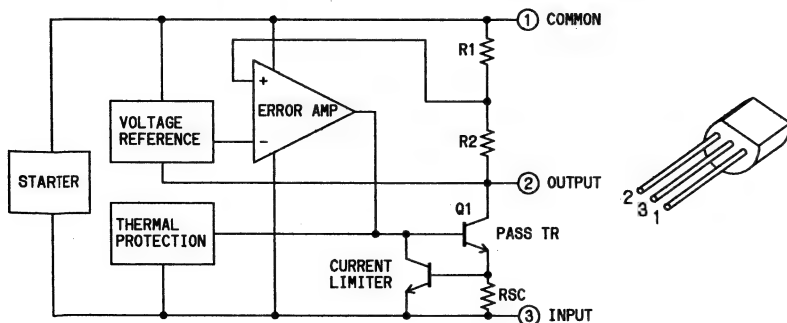
AN78L00
(3-TERMINAL POSITIVE OUTPUT VOLTAGE REGULATOR)



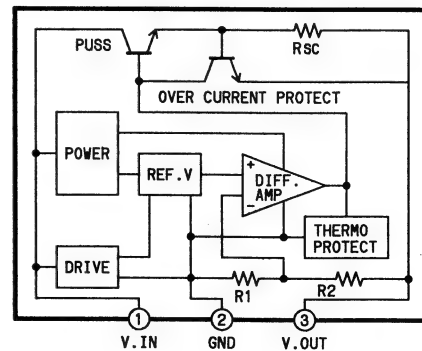
AN78N00
(3-TERMINAL POSITIVE OUTPUT VOLTAGE REGULATOR)



AN79L00
(3-TERMINAL NEGATIVE OUTPUT VOLTAGE REGULATOR)

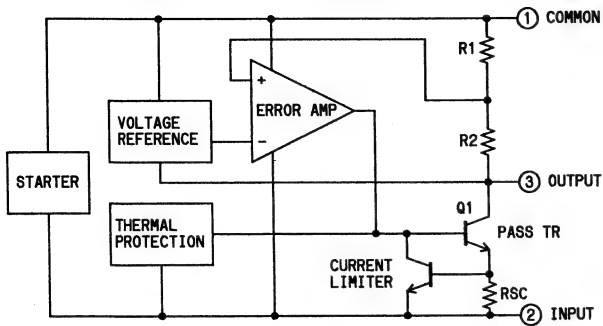


AN7805

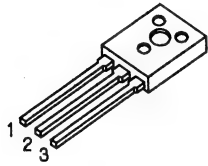
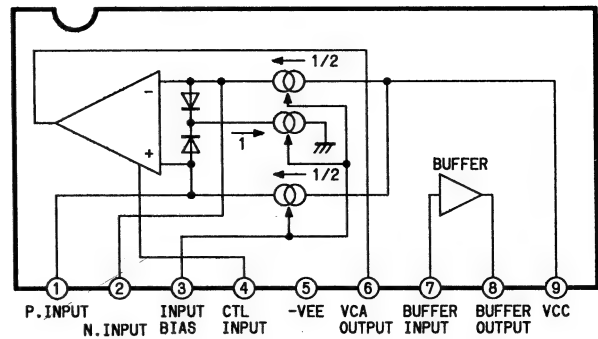


AN79N00

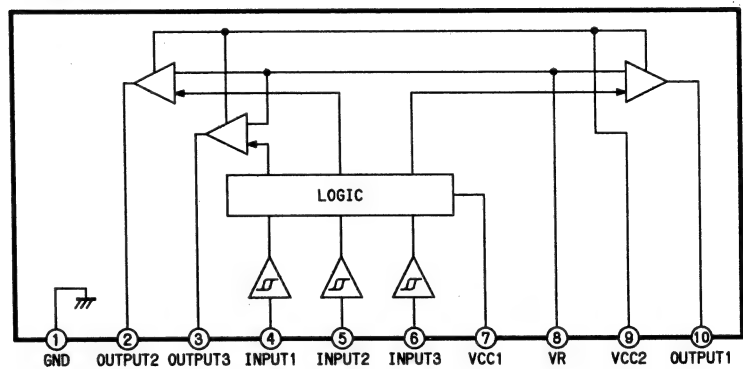
(3-TERMINAL NEGATIVE OUTPUT VOLTAGE REGULATOR)

**BA6110**

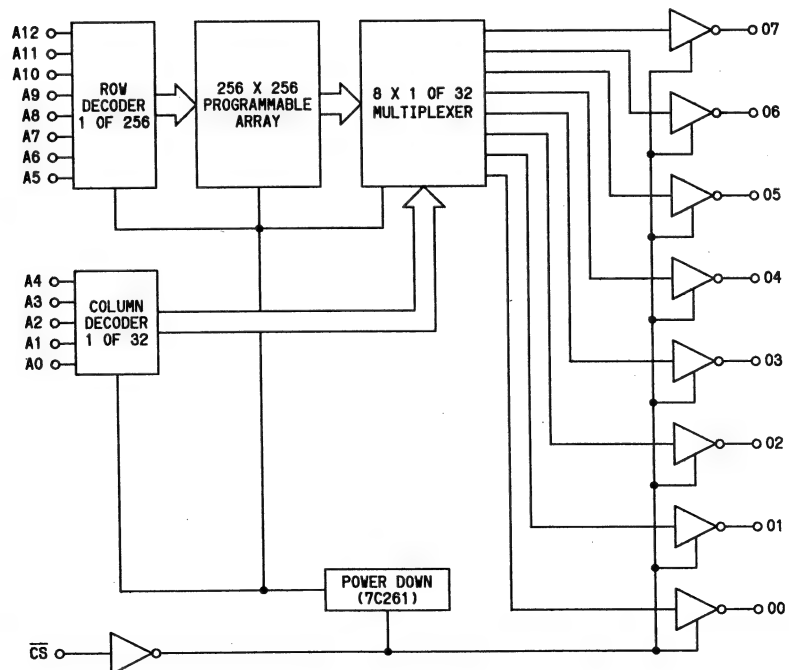
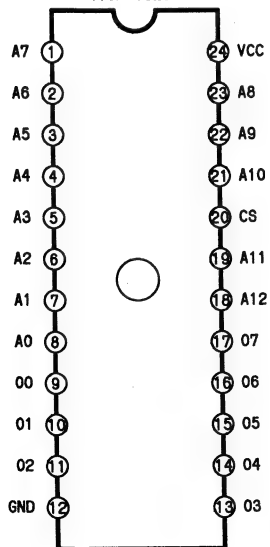
(VOLTAGE CONTROL AMP)

**BA6238**

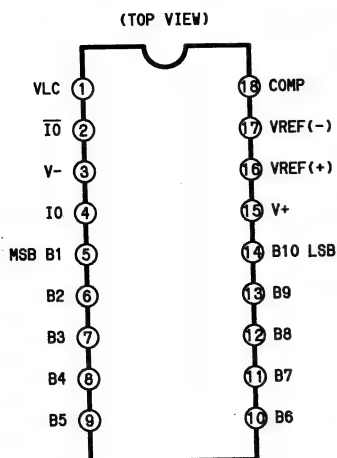
(LOADING REGULATOR)

**CY261-45WC**

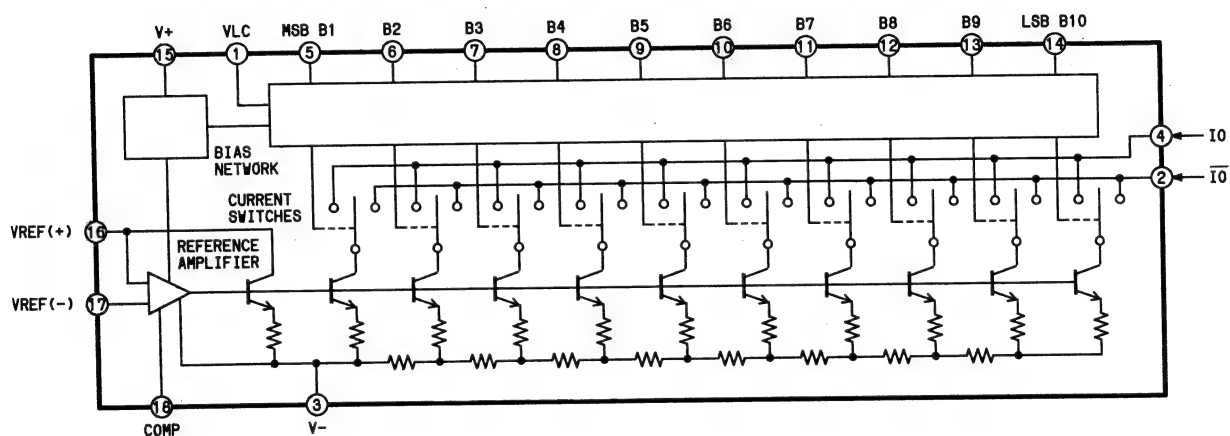
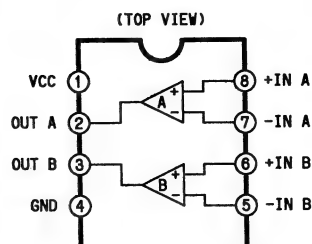
(TOP VIEW)



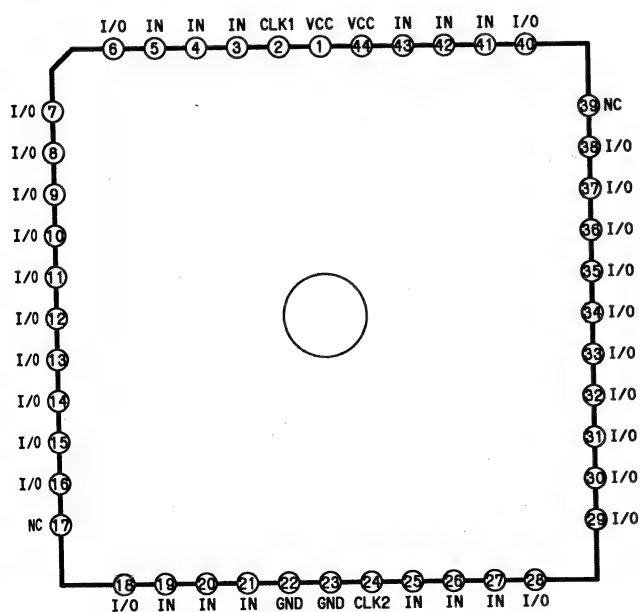
DAC10-GX (10-BIT D/A CONVERTER)
(18PIN HERMETIC DIP)



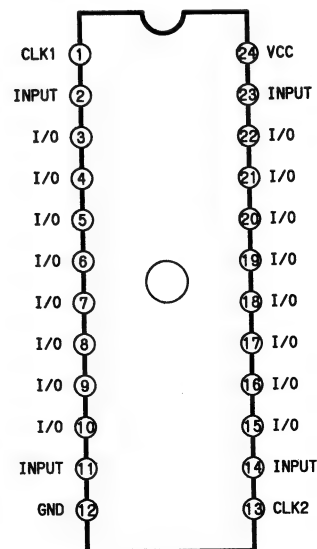
D89637A
(DUAL DIFFERENTIAL LINE RECEIVER)



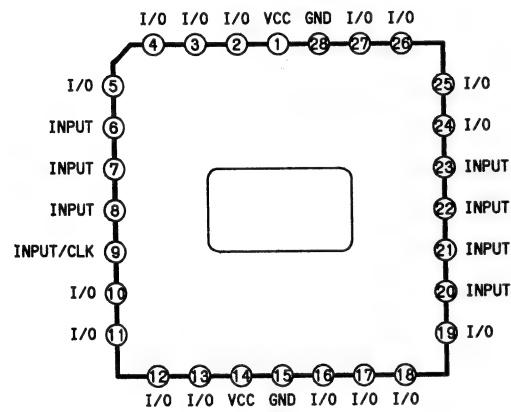
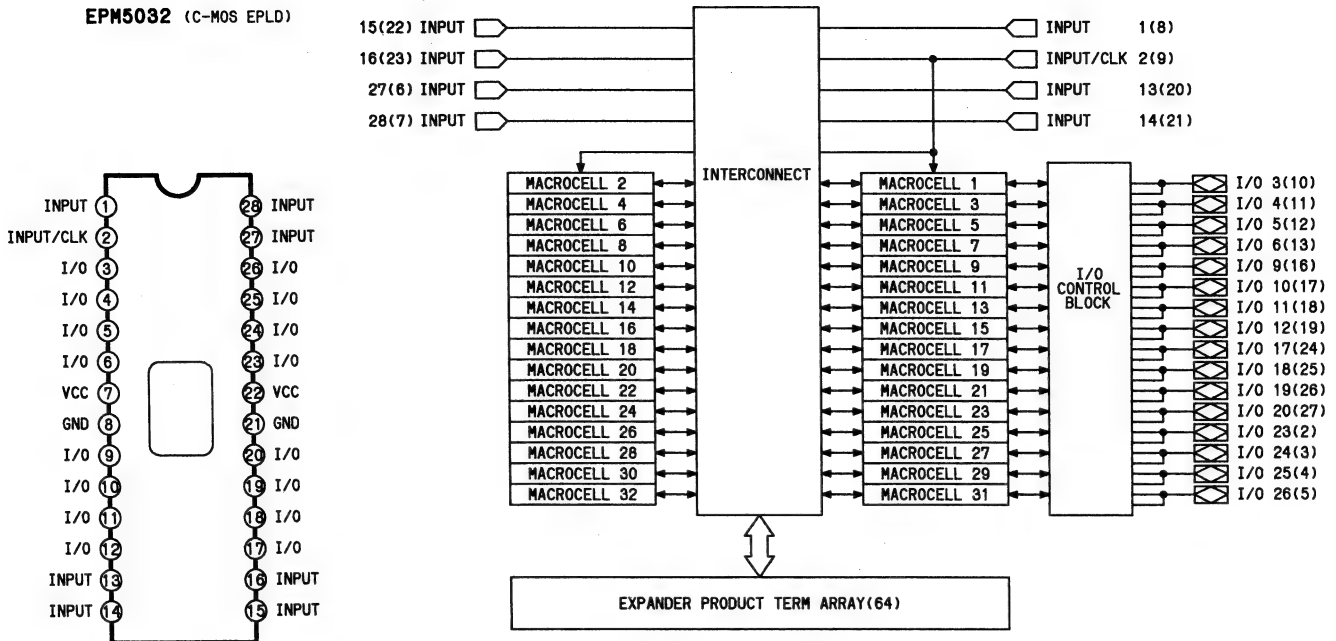
EP910 (C-MOS EPROM) (TOP VIEW)



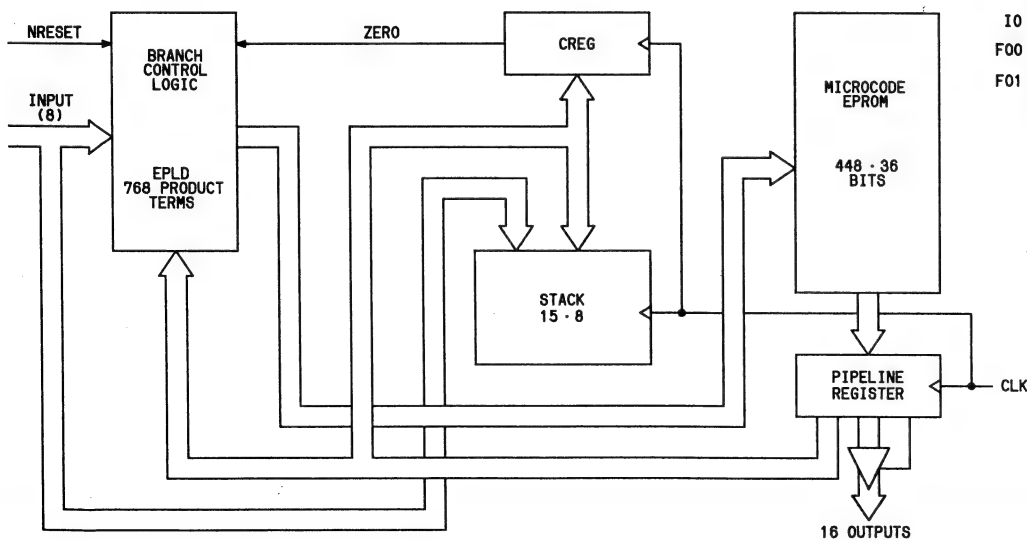
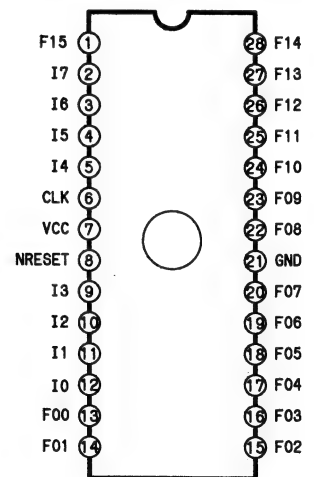
EP610
(16 MACROCELL EPLD)
(TOP VIEW)



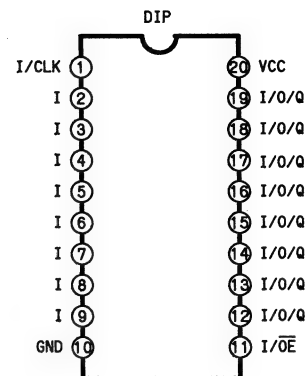
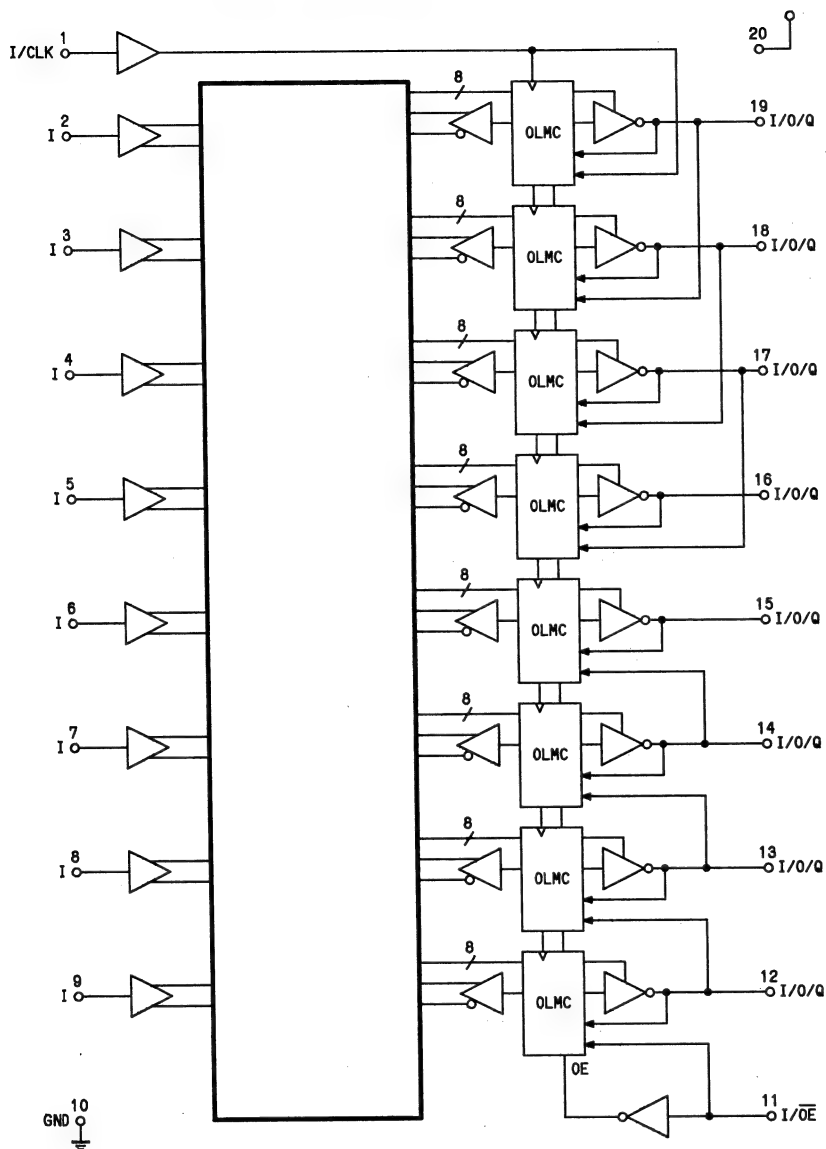
EPM5032 (C-MOS EPLD)



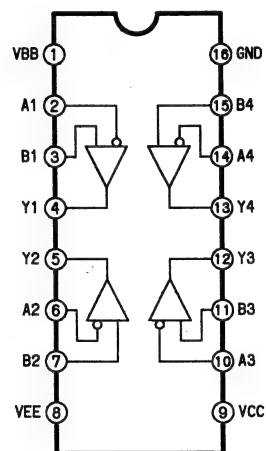
EP8448 (STAND-ALONE MICRO SEQUENCER)



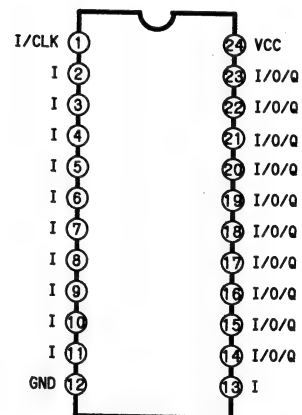
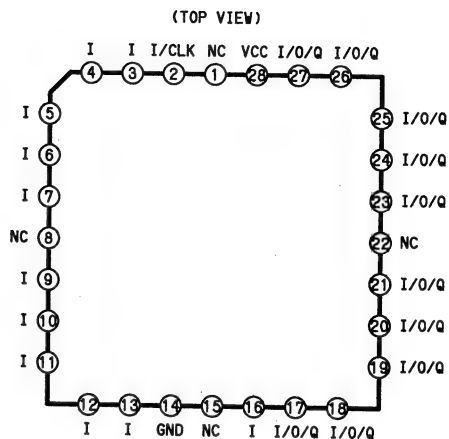
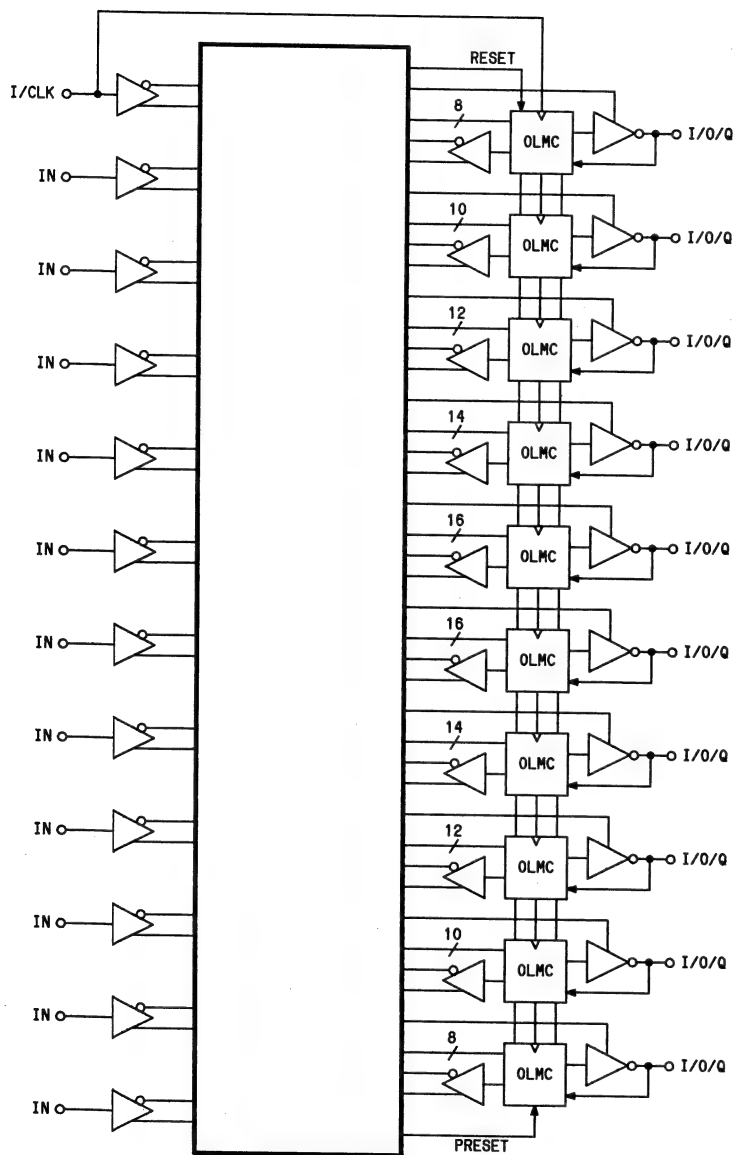
GAL16V8A
(E³ CMOS 64×32 PROGRAMMABLE AND ARRAY)



HD10125
(QUADRUPLE ECL
TO TTL TRANSLATORS)
(TOP VIEW)



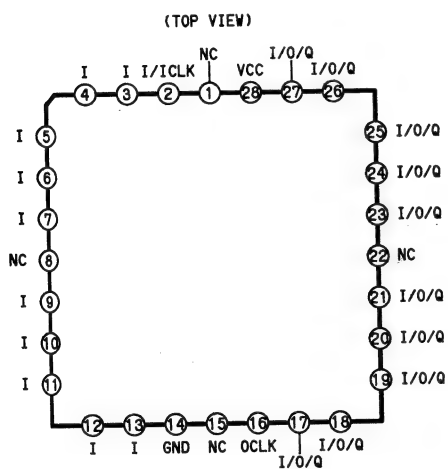
GAL22V10
(PROGRAMMABLE AND-ARRAY (132 × 44))



(TOP VIEW)

Pinout details for 74VHC04 (TOP VIEW):

- Pin 1: VICKL
- Pin 2: I
- Pin 3: I
- Pin 4: I
- Pin 5: I
- Pin 6: I
- Pin 7: I
- Pin 8: I
- Pin 9: I
- Pin 10: I
- Pin 11: I
- Pin 12: GND
- Pin 13: OCLK
- Pin 14: I/O/Q
- Pin 15: I/O/Q
- Pin 16: I/O/Q
- Pin 17: I/O/Q
- Pin 18: I/O/Q
- Pin 19: I/O/Q
- Pin 20: I/O/Q
- Pin 21: I/O/Q
- Pin 22: I/O/Q
- Pin 23: I/O/Q
- Pin 24: VCC

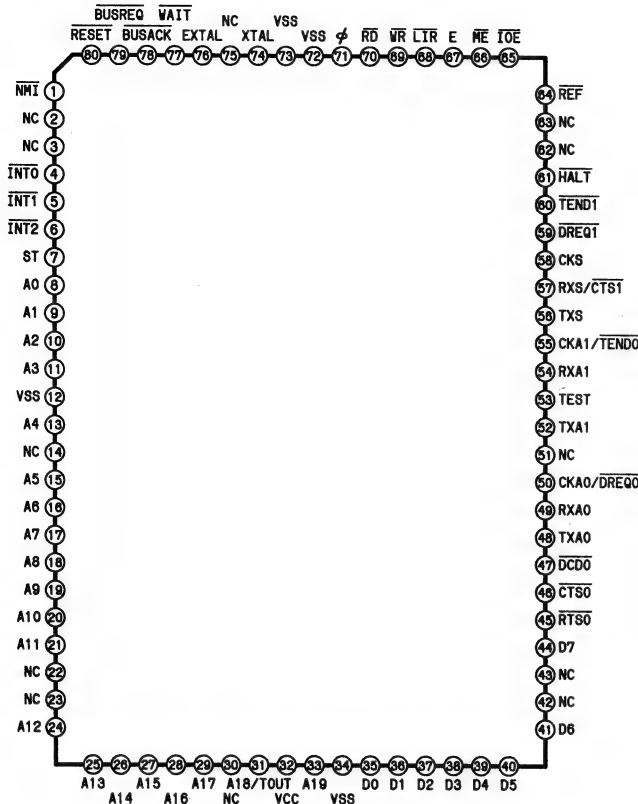


(TOP VIEW)

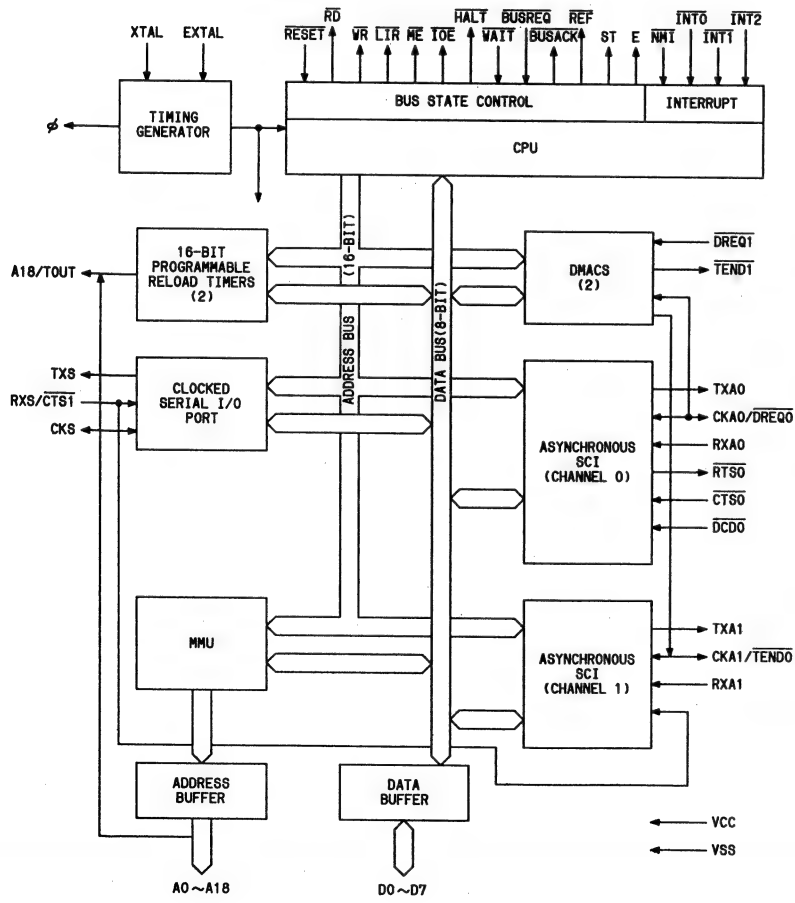
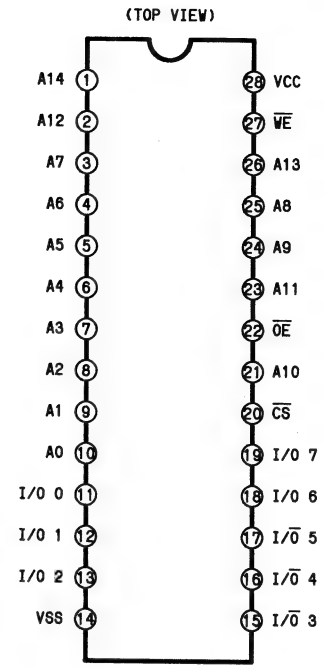
S	1	16	VCC
QA	2	15	QD
IOA	3	14	IOD
IIA	4	13	IID
IIB	5	12	IIC
IOB	6	11	IOC
QB	7	10	QC
GND	8	9	CP

The logic diagram illustrates a 4-bit parallel adder. It features four D flip-flops, each representing a bit of the sum (QA, QB, QC, QD). The inputs to the adder are two 4-bit numbers, IOA (I0A, I1A, I2A, I3A) and IOB (I0B, I1B, I2B, I3B), and a carry-in CP. The carry-in CP is inverted and connected to the CP input of the first flip-flop (QA) and the D input of the fourth flip-flop (QD). The D inputs of the other flip-flops are connected to the outputs of logic gates. For each bit position i (0 to 3), the D input of the flip-flop Qi is the XOR of the i-th bits of IOA and IOB (Ai ⊕ Bi). The carry input (CP) of each flip-flop Qi is the AND of the i-th bits of IOA and IOB (Ai · Bi). The carry output of the fourth flip-flop (QD) is the final carry-out, which is inverted and fed back to the carry-in of the first flip-flop (QA).

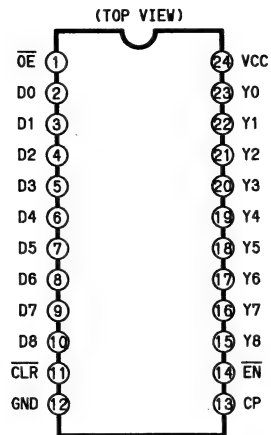
HD64180
(8BIT MC)



HM62832P-35
(262,144-BIT C-MOS RAM)

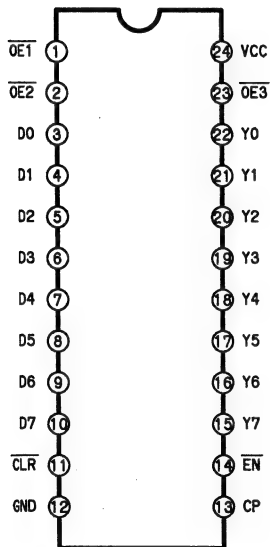


IDTFCT823880 (LATCH)



IDTFCT825AP (LATCH)

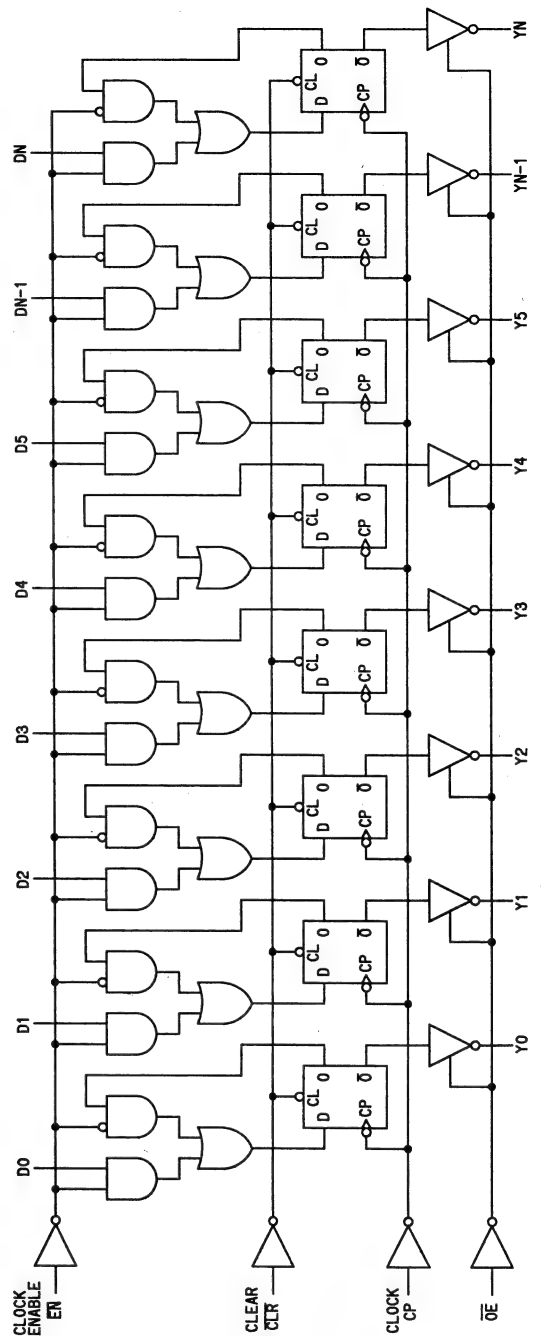
(TOP VIEW)



TRUTH TABLE

INPUTS					INTERNAL OUTPUTS		FUNCTION
OE	CLR	EN	D1	CP	Q1	Y1	
H	X	L	L	↑	L	Z	HIGH Z
H	X	L	H	↑	H	Z	
H	L	X	X	X	L	Z	CLEAR
L	L	X	X	X	L	L	
H	H	H	X	X	NC	Z	HOLD
L	H	H	X	X	NC	NC	
H	H	L	L	↑	L	Z	LOAD
H	H	L	H	↑	H	Z	
L	H	L	L	↑	L	L	
L	H	L	H	↑	H	H	

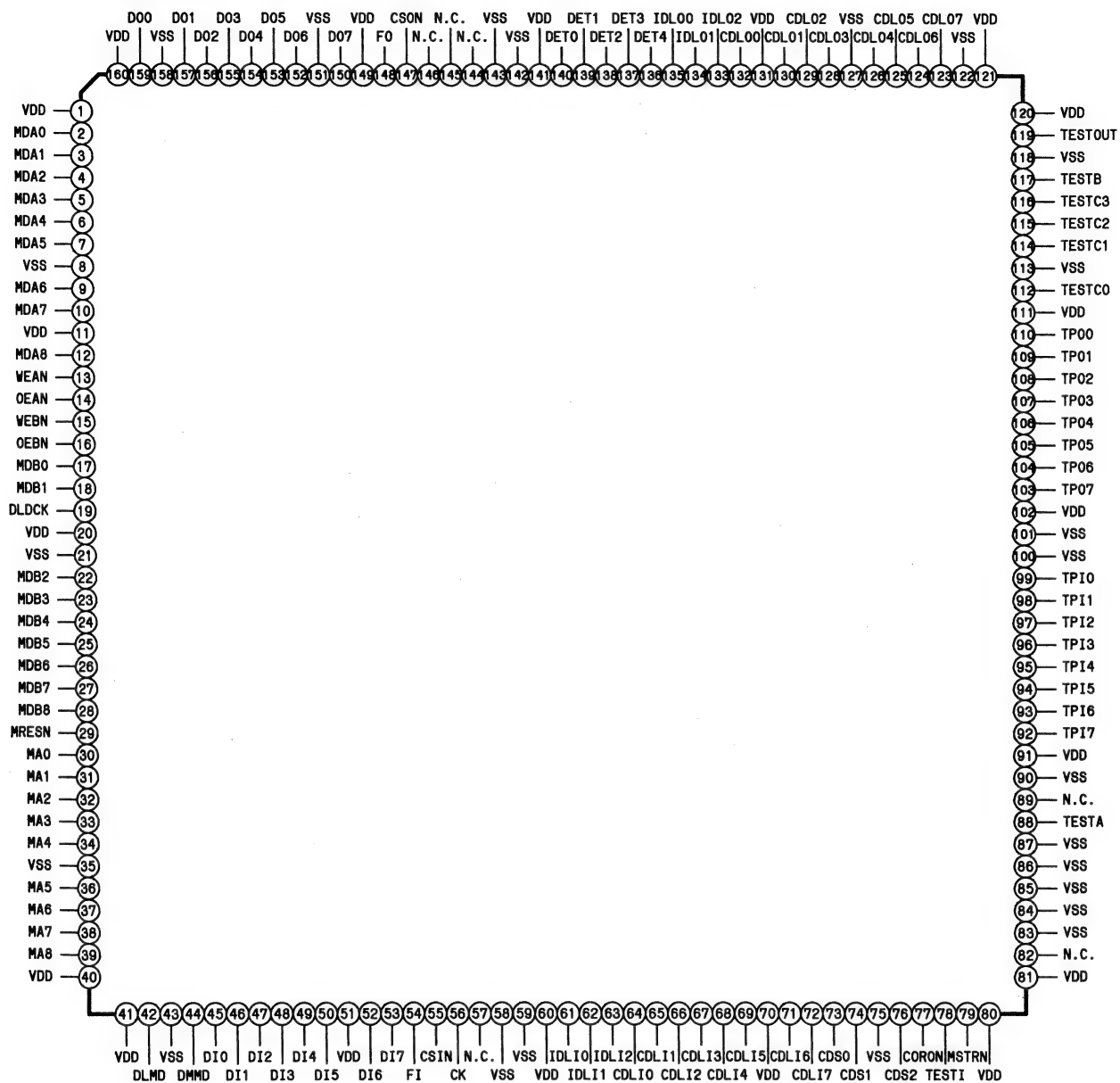
H:HIGH L:LOW X:DON'T CARE
NC:NO CHANGE ↑:LOW TO HIGH TRANSITION
Z:HIGH IMPEDANCE



INPUTS					INTERNAL OUTPUTS		FUNCTION
OE	CLR	EN	D1	CP	Q1	Y1	
H	X	L	L	T	L	Z	HIGH Z
H	X	L	H	T	H	Z	
H	L	X	X	X	L	Z	CLEAR
L	L	X	X	X	L	L	
H	H	H	X	X	NC	Z	HOLD
L	H	H	X	X	NC	NC	
H	H	L	L	T	L	Z	LOAD
H	H	L	H	T	H	Z	
L	H	L	L	T	L	L	
L	H	L	H	T	H	H	

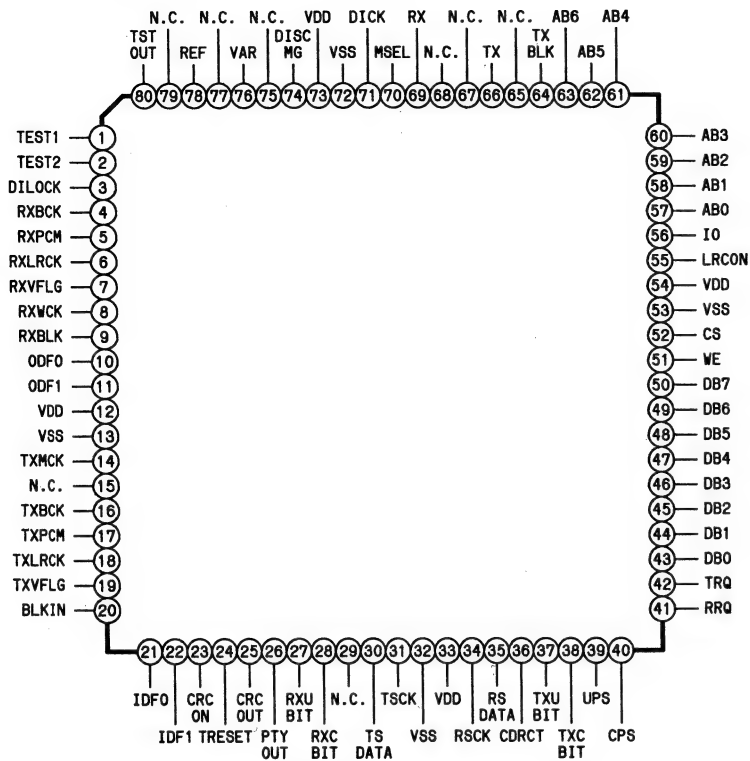
L7A0343 (OUTER ECC DECODER)
(160 PIN QFP)

(TOP VIEW)



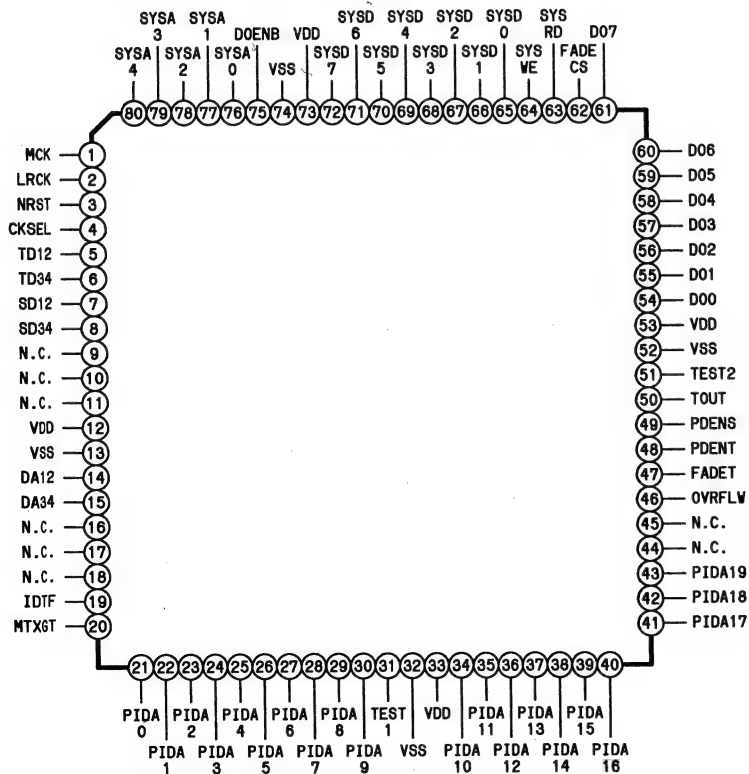
(80PIN QFP)

(TOP VIEW)



(80PIN QFP)

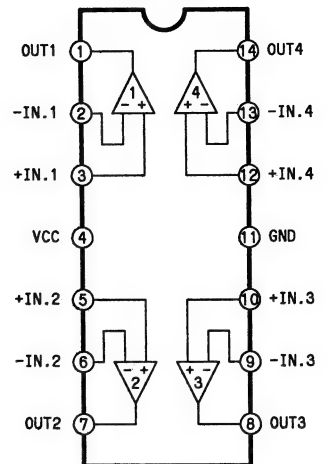
(TOP VIEW)



LM2902

(4 INPUTS SIGNAL SOURCE OP AMP)

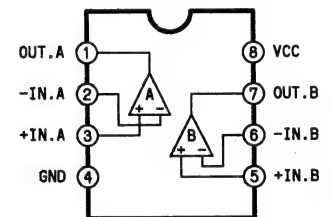
(TOP VIEW)



LM2904

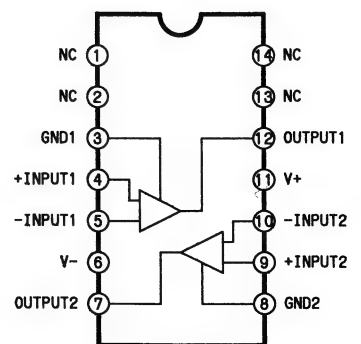
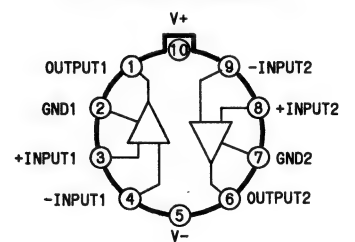
(2 INPUTS SINGLE SOURCE OP AMP)

(TOP VIEW)



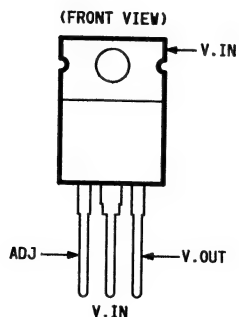
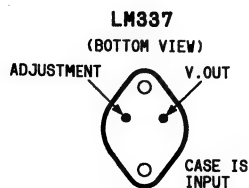
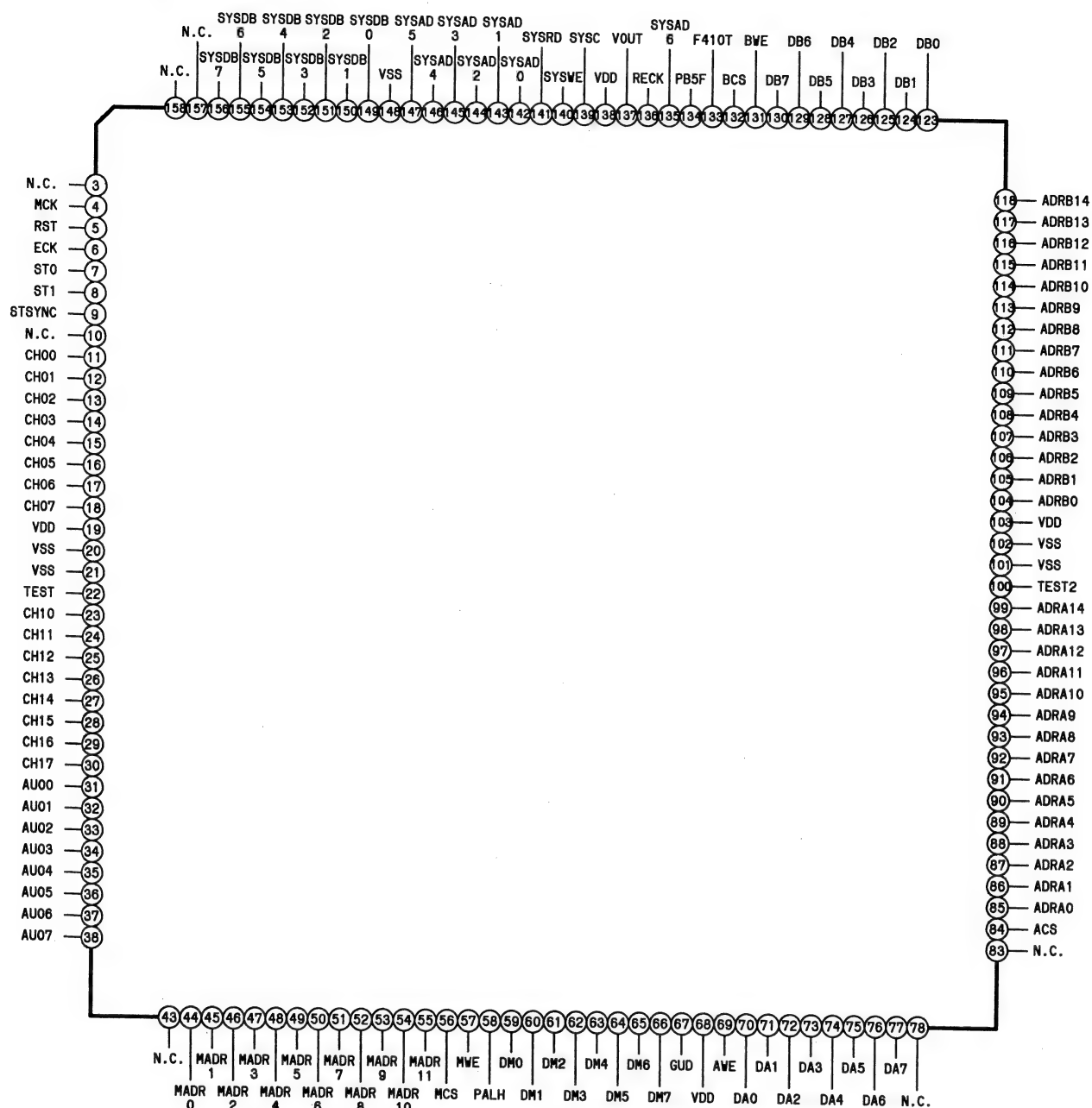
LM319

(DUAL VOLTAGE COMPARATOR)



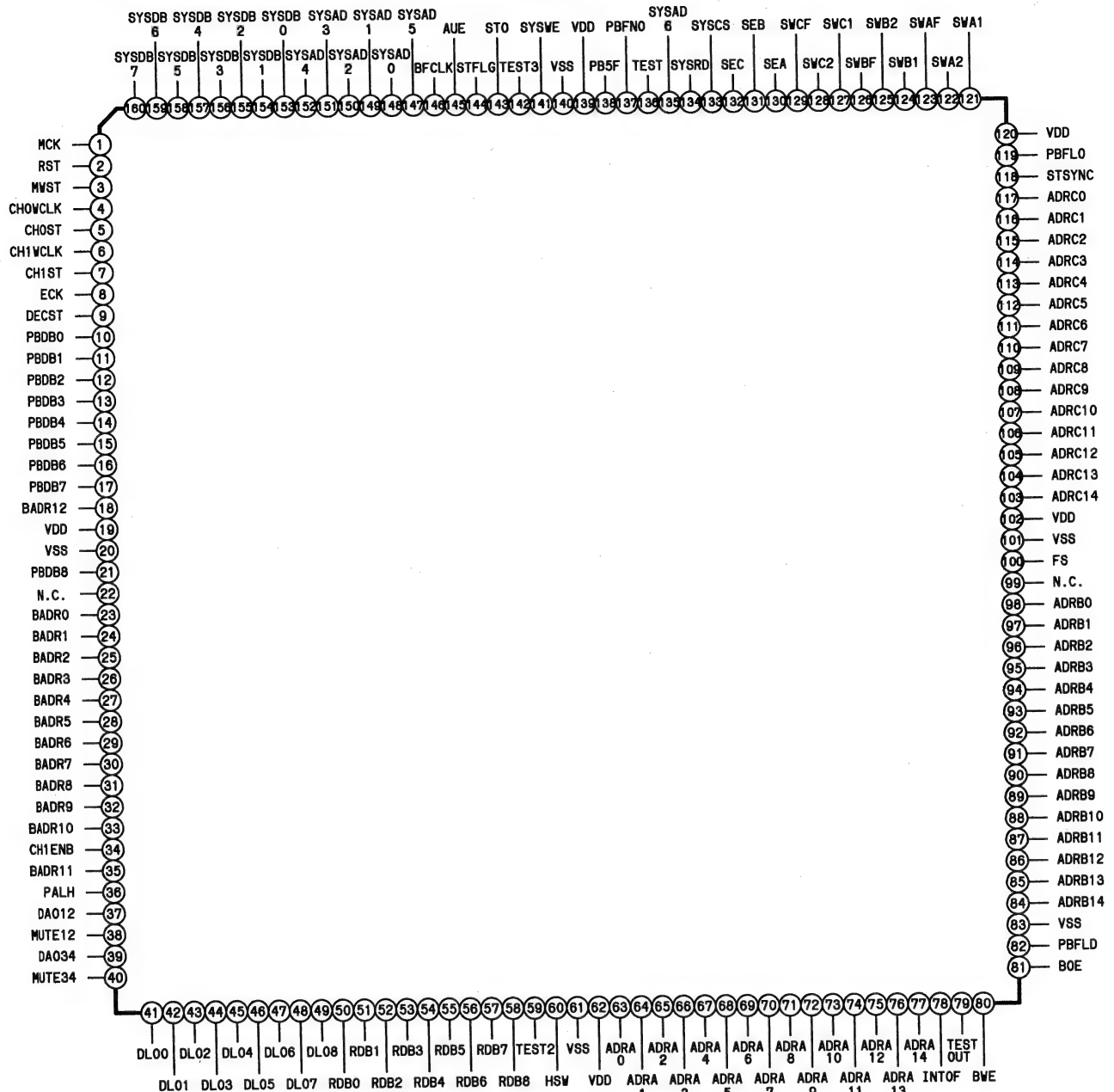
L7A0674 (PCM REC)
(160 PIN QFP)

(TOP VIEW)

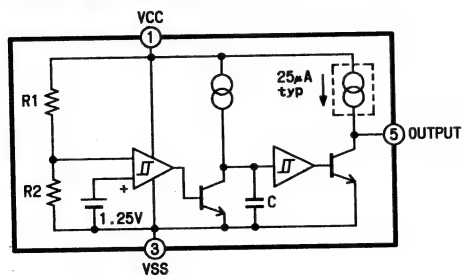


L7A0782 (AUDIO DESHUFFLE)

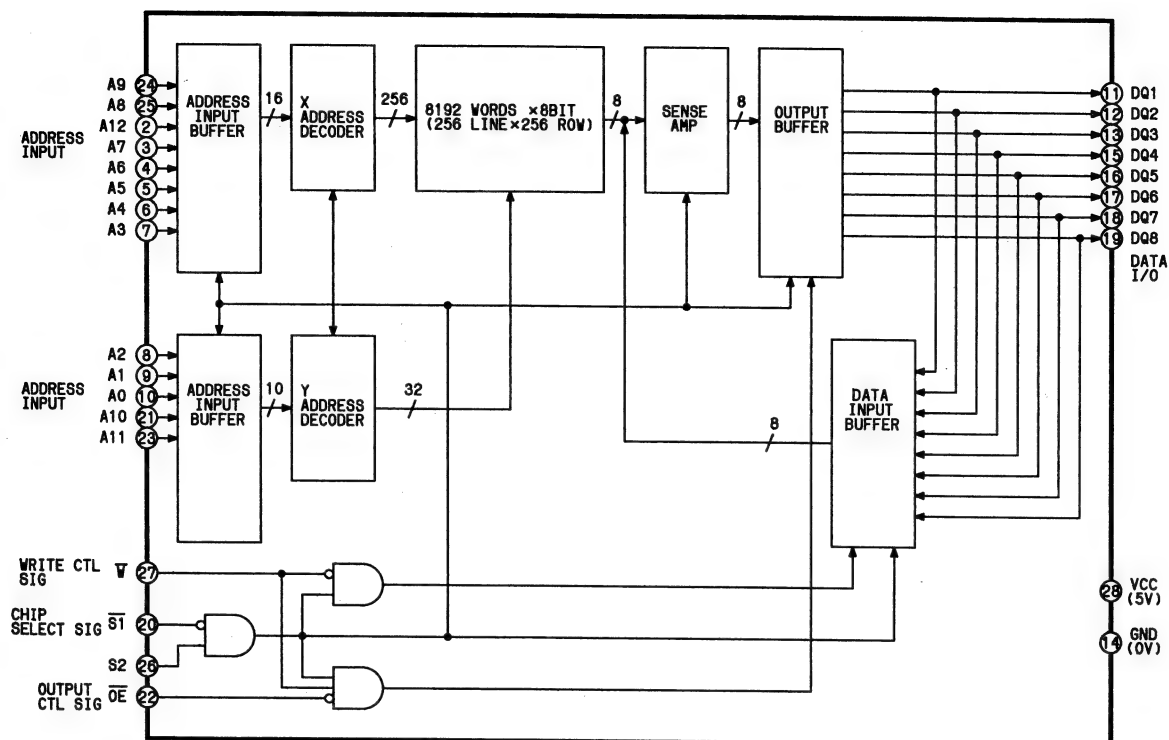
(TOP VIEW)



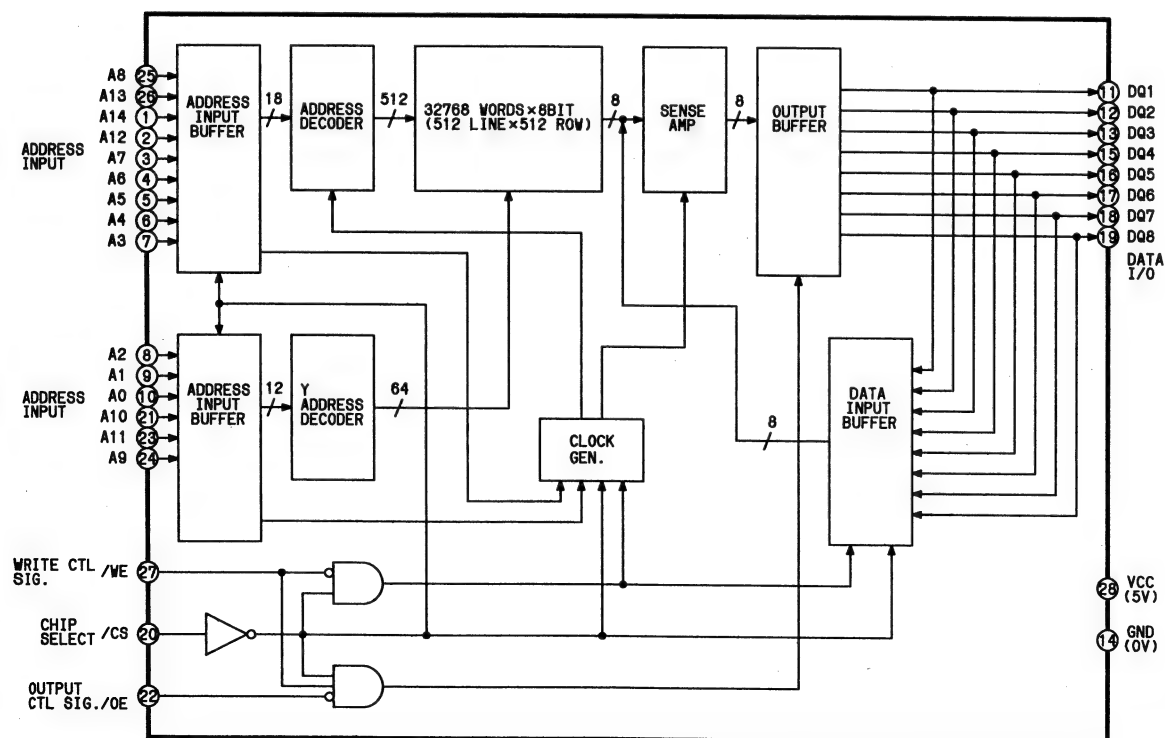
M51951
(VOLTAGE DETECTOR/DELAY CIRCUIT)



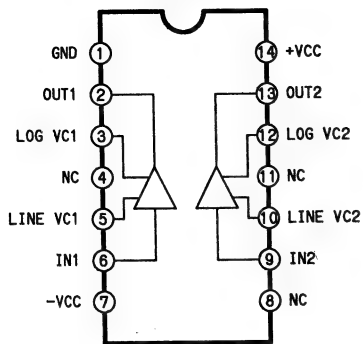
M5165FP-10L (8-BIT RAM)



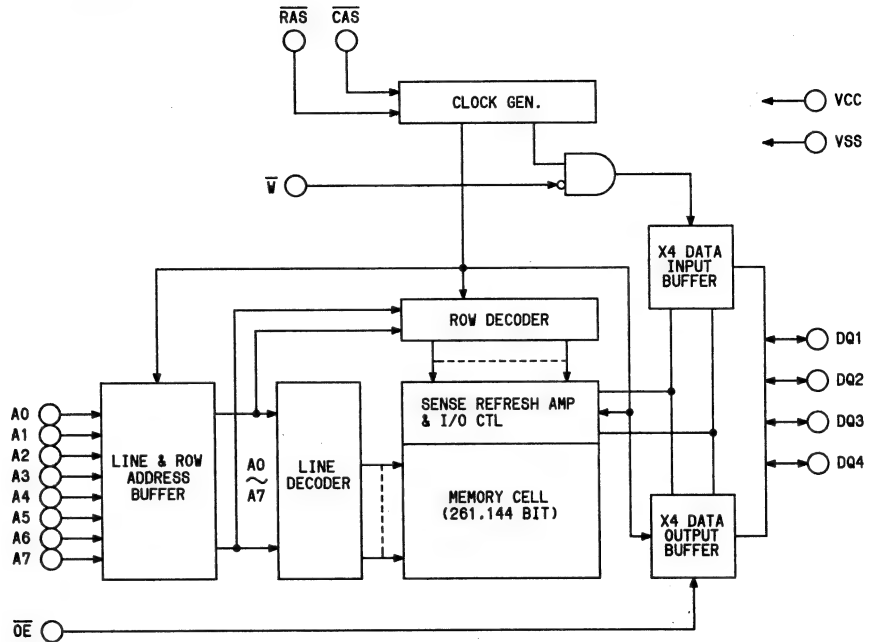
M5256BFP-70 (8-BIT RAM)



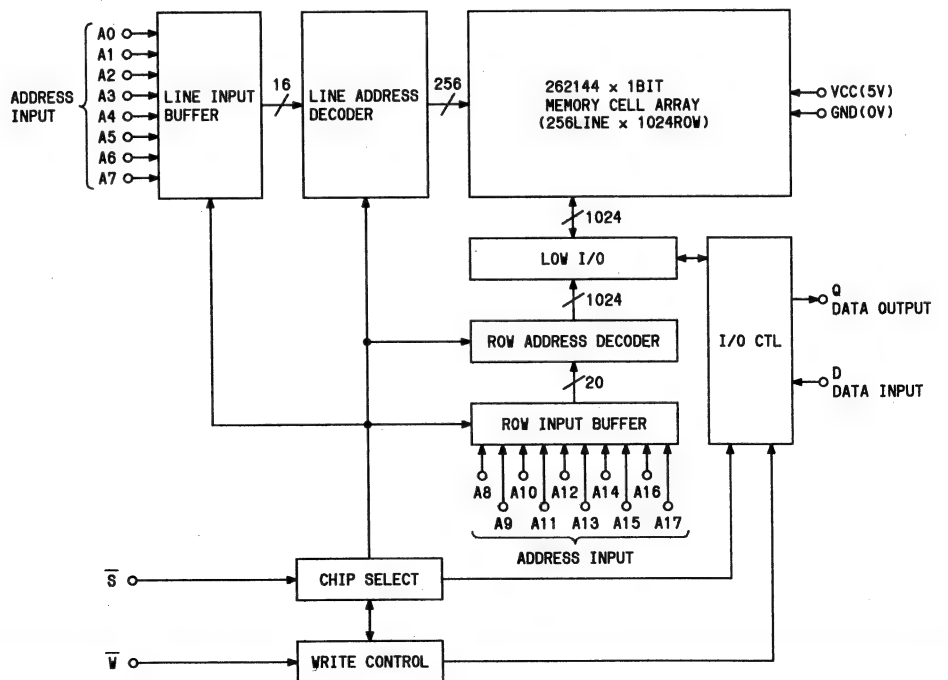
M5206P
(DUAL VCA FOR ELECTRONIC VOLUME)
(TOP VIEW)



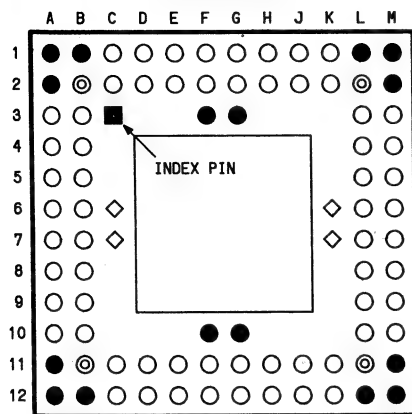
M5M4464AL-12



M5M5257P-35 (S-RAM)



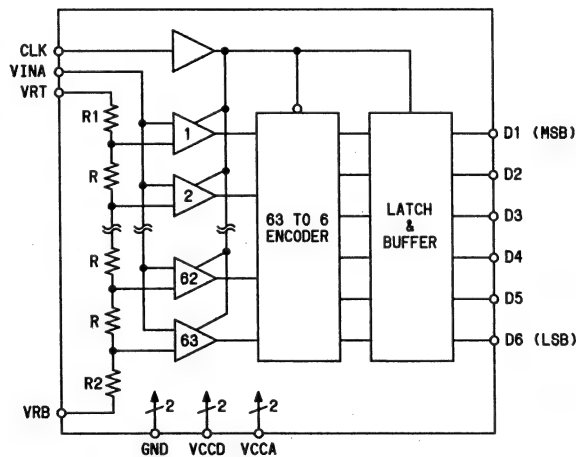
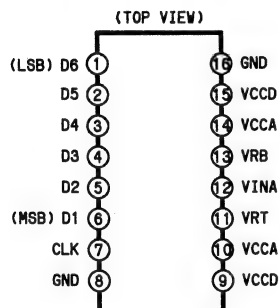
MB121M246 (PARALLEL SERIAL CONVERTER)
(BOTTOM VIEW)



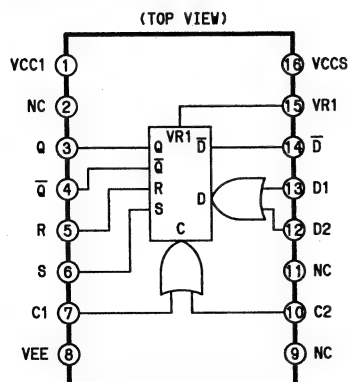
- : SIGNAL PIN
● : GND
◇ : VEE = -5.2V
◎ : VCC = +5V

PIN NO.	I/O	PIN NAME	PIN NAME	PIN NO.	I/O	PIN NAME	PIN NAME
B10	B	BP01	AD1	F01	0	W21	A2WCLK
A10	B	BP00	AD0	E02	0	XW1	XAWCLK
B09	B	BP03	AD3	E01	0	W1	AWCLK
A09	B	BP02	AD2	D01	0	OCK1	ARECLK
A08	B	BP04	AD4	D02	0	XOK1	XARECLK
B08	B	BP05	AD5	C01	0	OS1	AREDATA
A07	B	BP06	AD6	C02	0	XOS1	XAREDATA
B07	I	ASYC	ASYIN	K11	I	XIS2	BPBDATA
B06	I	APS1	ASUP0S1	K12	I	IS2	XPBDATA
A06	I	APS0	ASYPOS0	J11	-	IG01	IG01
B05	I	APS3	ASYPOS3	J12	-	IG02	IG02
A05	I	APS2	ASYPOS2	H12	I	CK2	BPBCLK
A04	0	S01	ASTOUT	H11	I	XCK2	XPBCLK
B04	0	XS01	XASYOUT	G12	I	RSET	RSET
A03	0	W21	A2WCLK	G11	-	IG03	IG03
B03	0	WT1	AWCLK	F11	-	IG04	IG04
K02	0	XOS2	BREDATA	F12	I	RECL	RECL
K01	0	OS2	XBREDATA	E11	I	XCK1	XAPBCLK
J02	0	XOK2	BRECLK	E12	I	CK1	APBCLK
J01	0	OCK2	XBRECLK	D12	-	IG05	IG05
H01	0	W2	BWCLK	D11	-	IG06	IG06
H02	0	XW2	XBWCLK	C12	I	IS1	APBDATA
G01	0	W22	B2WCLK	C11	I	XIS1	XAPBDATA
G02	0	XW22	XB2WCLK	L10	B	BP11	BD1
F02	0	XW21	XA2WCLK	M10	B	BP10	BD0
L09	B	BP13	BD3	M06	I	BPS0	BSYP0S0
M09	B	BP12	BD2	L05	I	BPS3	BSYP0S3
M08	B	BP14	BD4	M05	I	BPS2	BSYP0S2
L08	B	BP15	BD5	M04	0	S02	BSYOUT
M07	B	BP16	BD6	L04	0	XS02	XBSYOUT
L07	I	BSYC	BSYIN	M03	0	W2T2	B2WCLKT
L06	I	BPS1	BSYPOS1	L03	0	WT2	BWCLKT

MB40576P (WINDOW AND ENCODER)



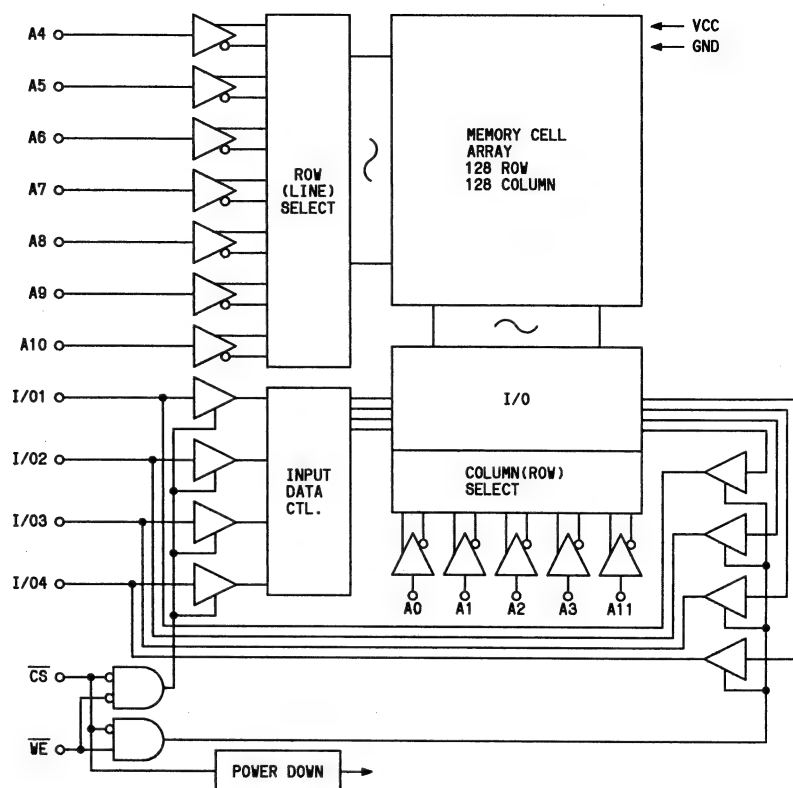
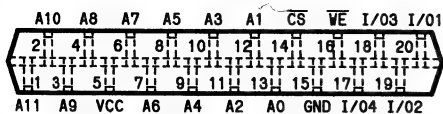
MB813AZ (LATCH)



INPUT				OUTPUT	
SET S	RESET R	CLOCK C	DATA D	Q	Q̄
H	H	X	X	*	*
H	L	X	X	H	L
L	H	X	X	L	H
L	L	↑	H	H	L
L	L	↑	L	L	H
L	L	L	X	Q0	Q0

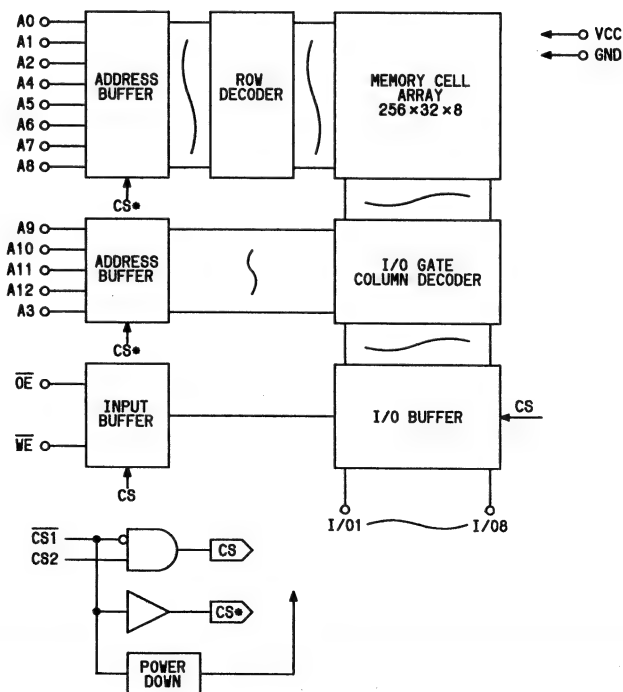
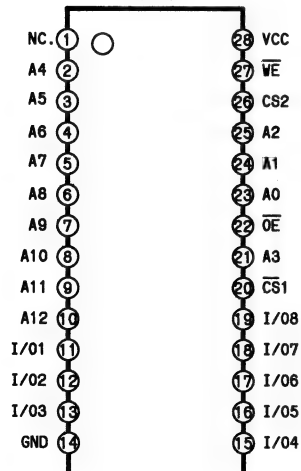
MB81C68A35PS

(TOP VIEW)

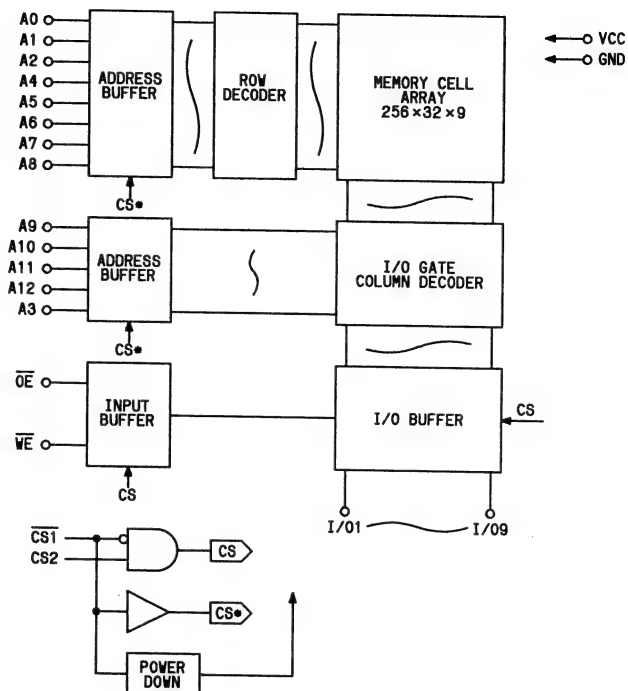
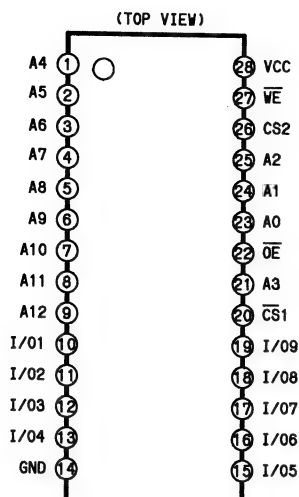


MB81C78A35PF (8K MEMORY)

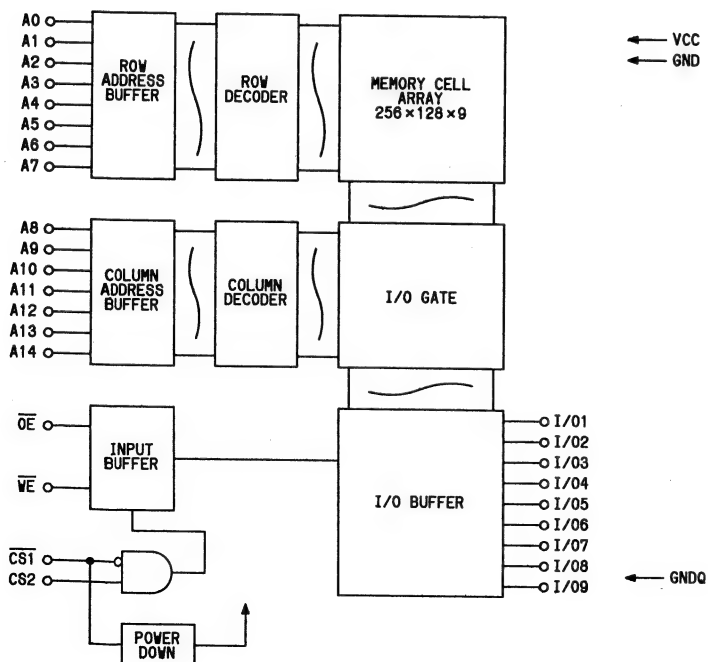
(TOP VIEW)



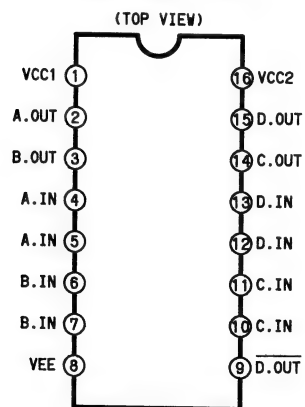
MB81C79A35PF (8K MEMORY)



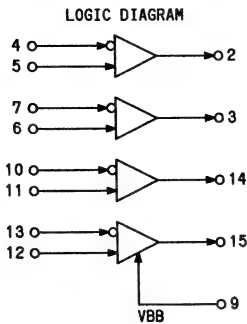
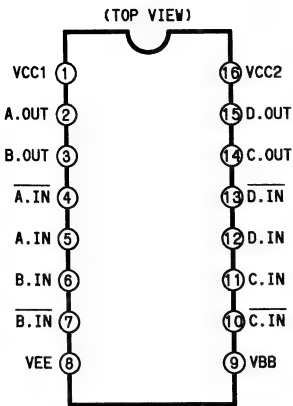
MB8289-25PF (FIELD MEMORY)



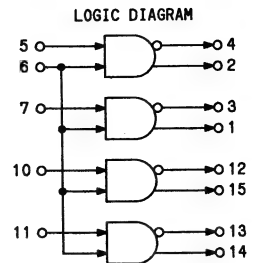
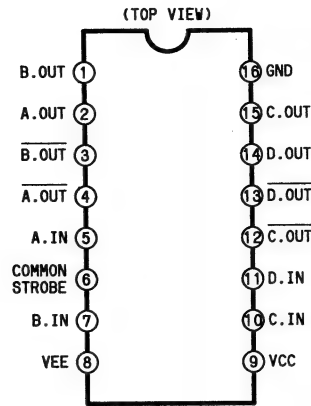
MC10104 (QUAD 2-INPUT AND GATE)



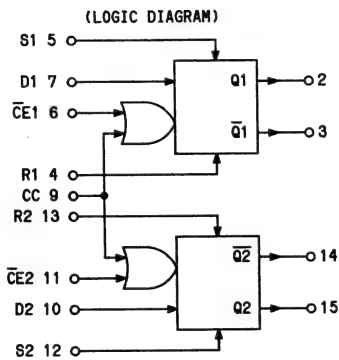
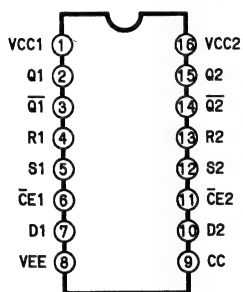
MC10115
(QUAD LINE RECEIVER)



MC10124
(QUAD TTL TO MECL TRANSLATOR)



MC10131
(DUAL TYPED MASTER-SLAVE FLIP-FLOP)



CLOCKED TRUTH TABLE

C	D	Q _{N-1}
L	φ	Q _N
H	L	L
H	H	H

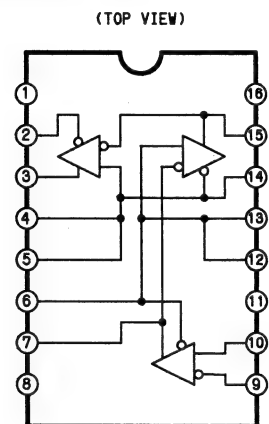
φ -DON'T CARE
C=CE+CC
A CLOCK H IS A CLOCK TRANSITION FROM A LOW TO A HIGH STATE.

R-S TRUTH TABLE

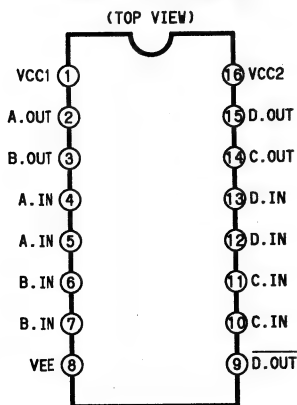
R	S	Q _{N-1}
L	L	Q _N
L	H	H
H	L	L
H	H	N.D.

N.D.-NOT DEFINED

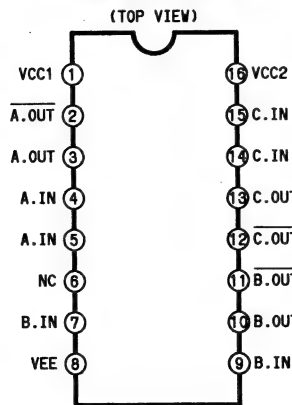
MC10116
(TRIPLE DIFFERENTIAL LINE RECEIVER)



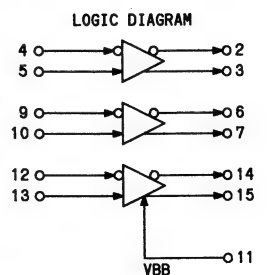
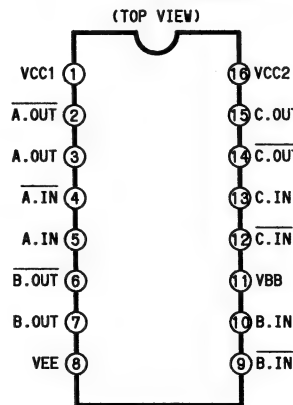
MC10H102
(QUAD 2-INPUT NOR GATE)



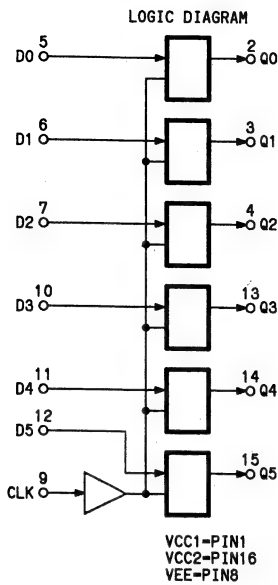
MC10H107
(TRIPLE 2-INPUT EXCLUSIVE "OR"/EXCLUSIVE "NOR")



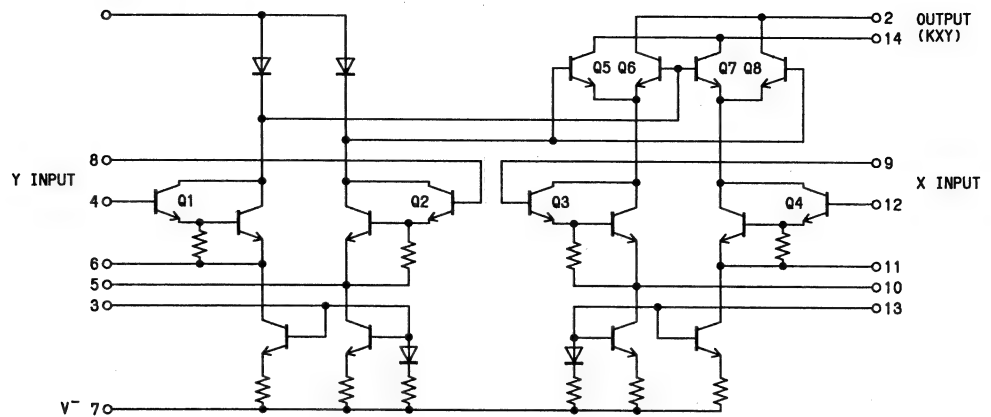
MC10H116
(TRIPLE LINE RECEIVER)



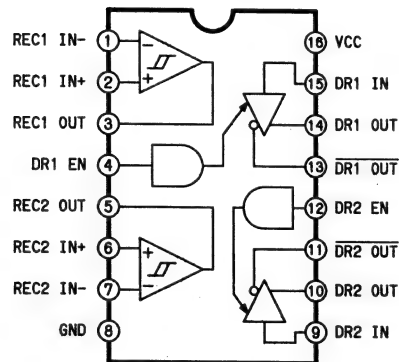
MC10H176
(HEX "D" MASTER-SLAVE FLIP-FLOP)



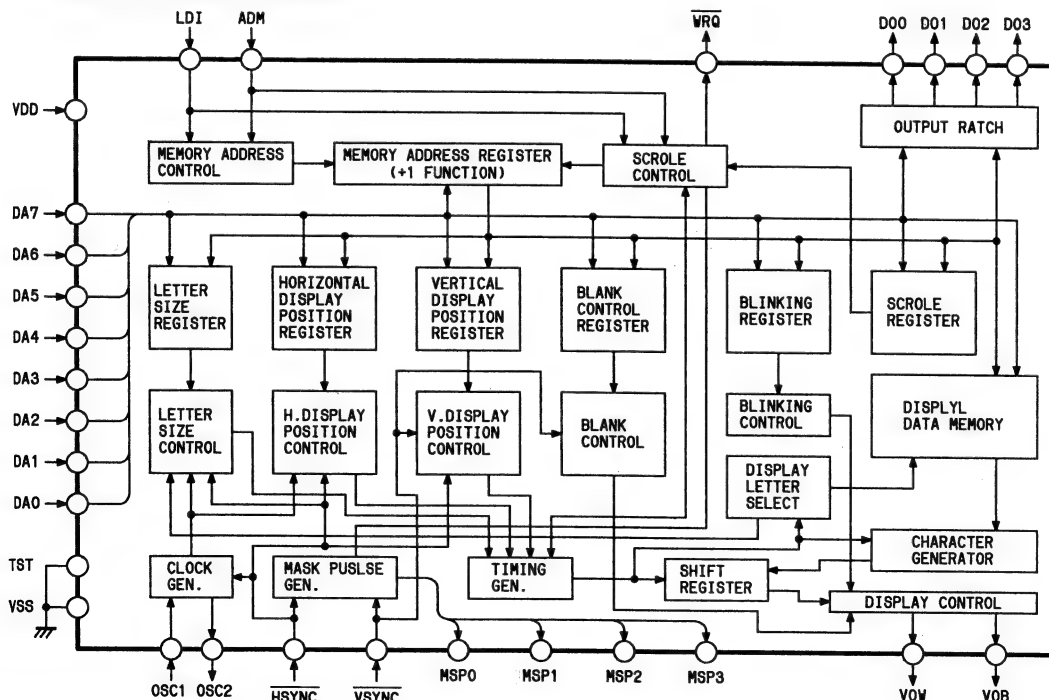
MC1495L
(ANALYSIS AND BASIC OPERATION)



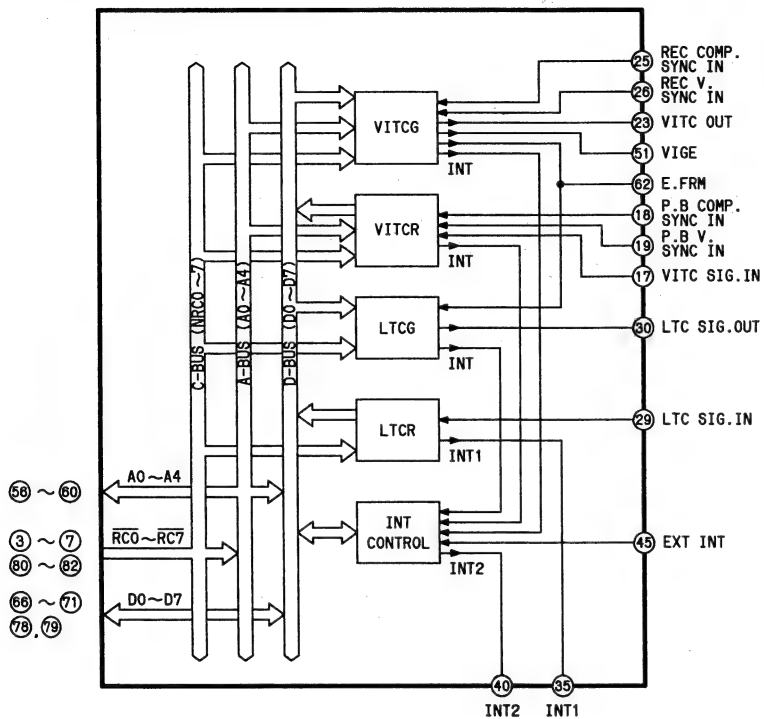
MC34051
(DUAL RS-422/423 TRANSCEIVER)



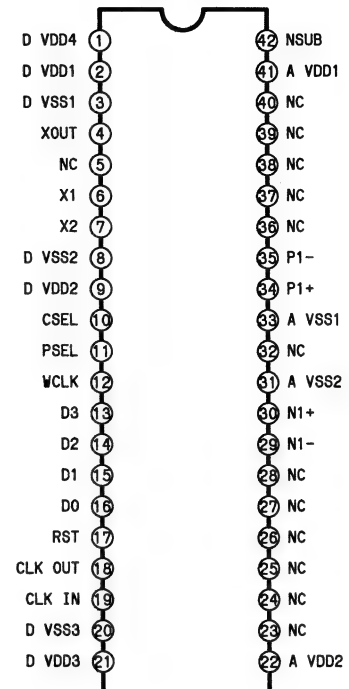
MN1287 (CHARACTER GENERATOR)



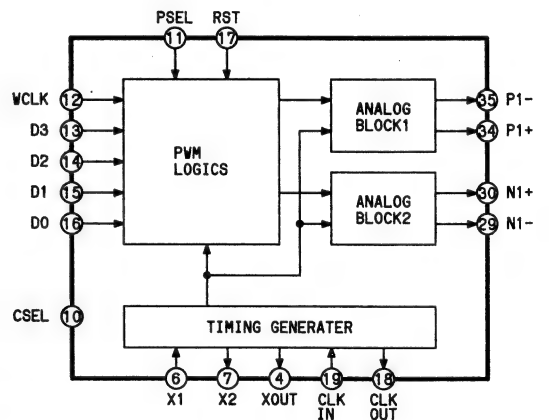
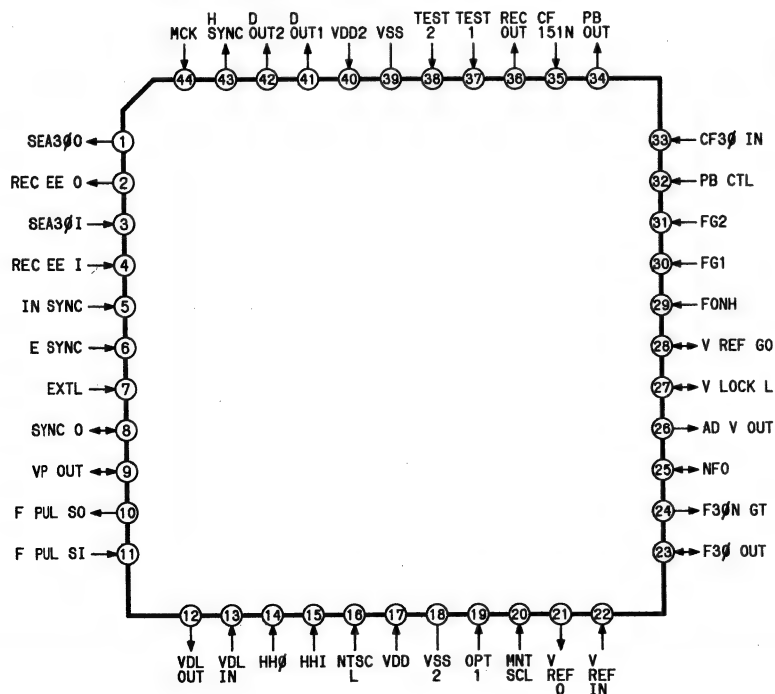
MN51040
(TIME CODE GENERATOR/READER)



MN64731 (PWM D/A)
(TOP VIEW)

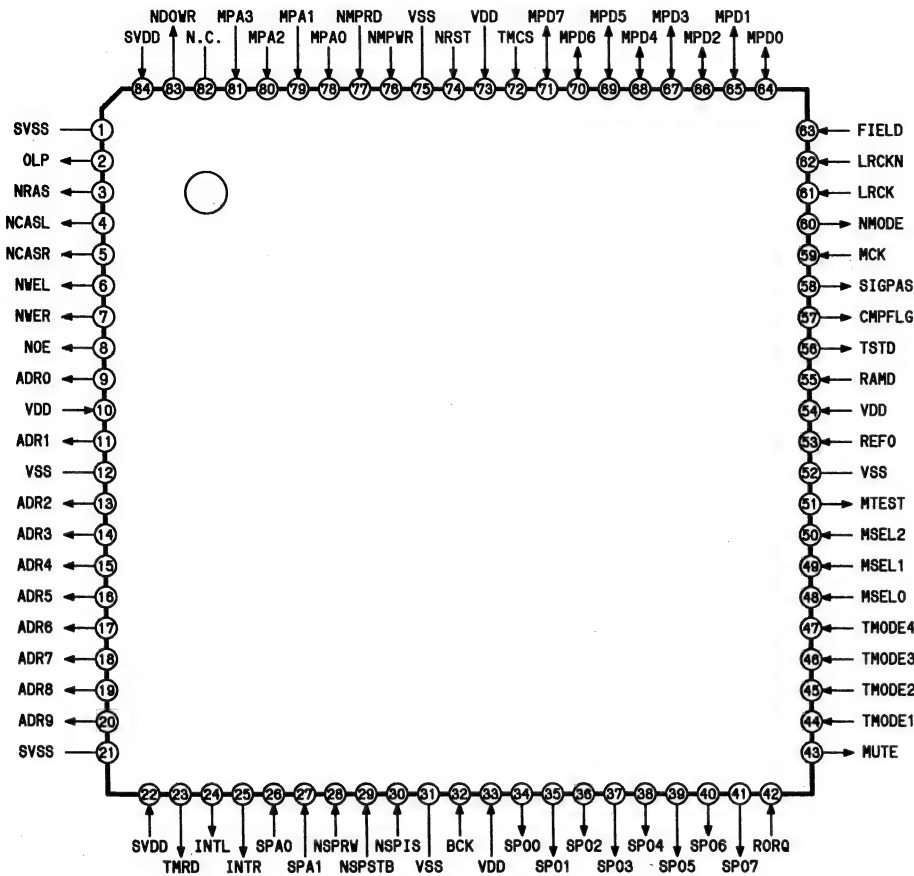


MN53015VZW
(1500 GATES C-MOS GATE ARRAY)



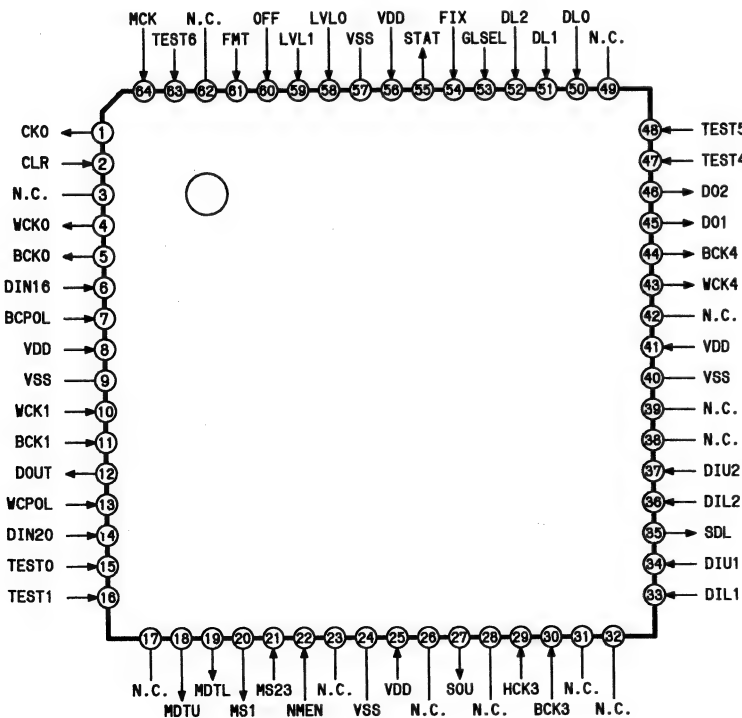
MN53040VP8 (SELECTOR)

(TOP VIEW)



MN53040VPQ (SELECTOR FOR A/D CONVERTER)

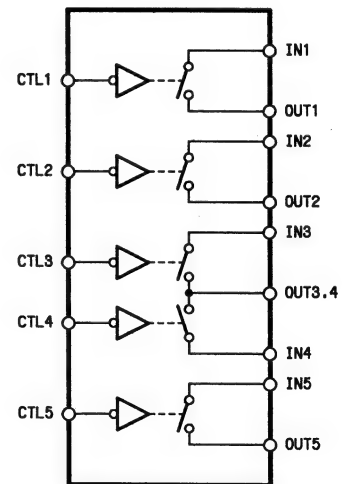
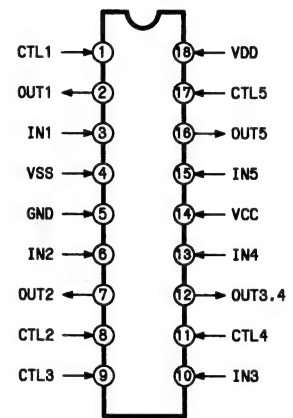
(TOP VIEW)



MN6631

(5-CHANNEL CMOS ELECTRONIC SWITCH)

(TOP VIEW)

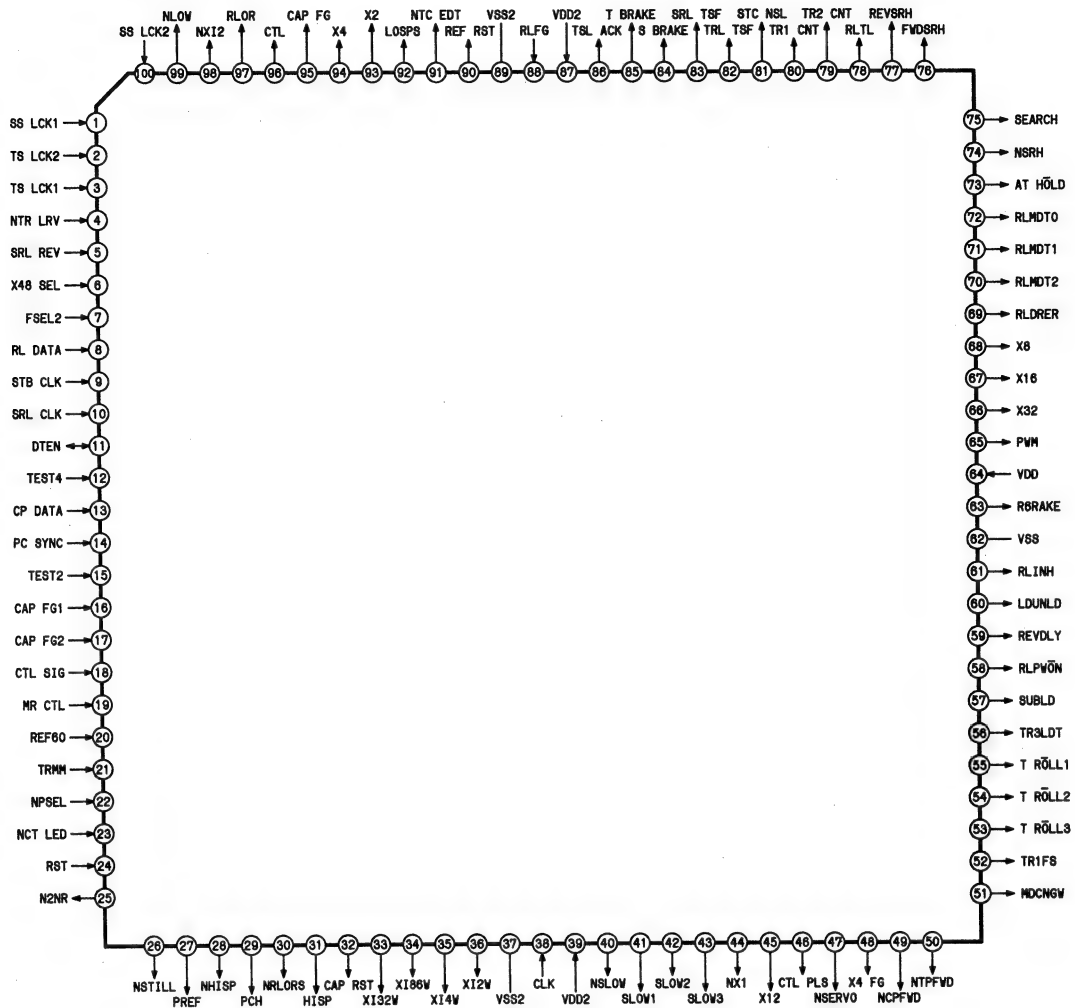


FUNCTION TABLE

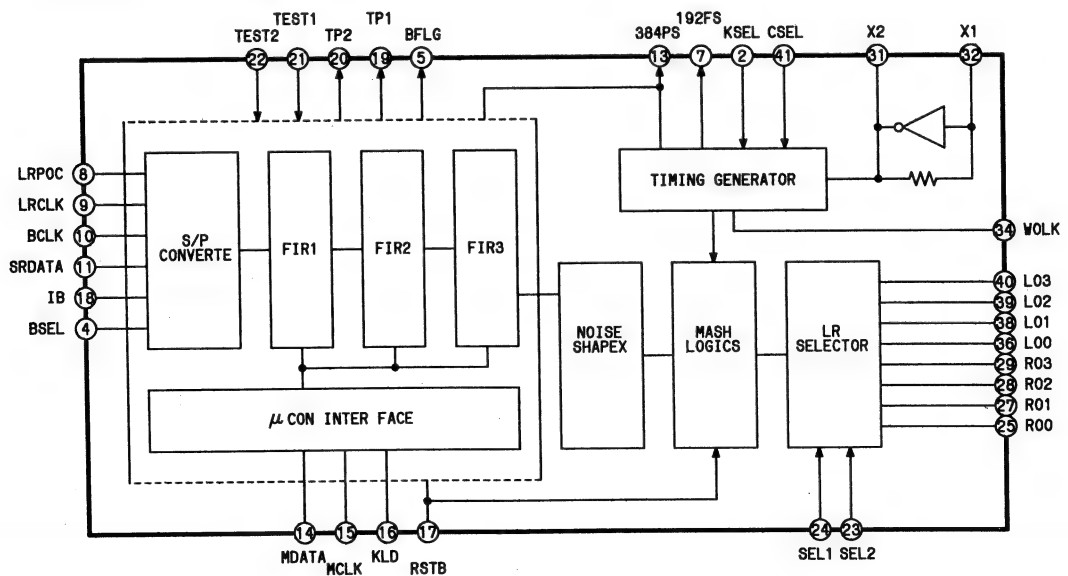
INPUT	SWITCH
L	ON
H	OFF

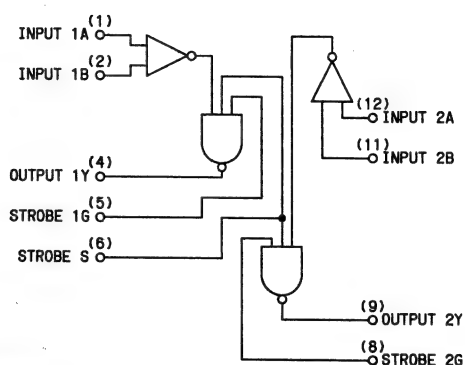
MN53030VYA (CONTROL FOR JOG)

(TOP VIEW)



MN64730 (DIGITAL ATTENUATOR)



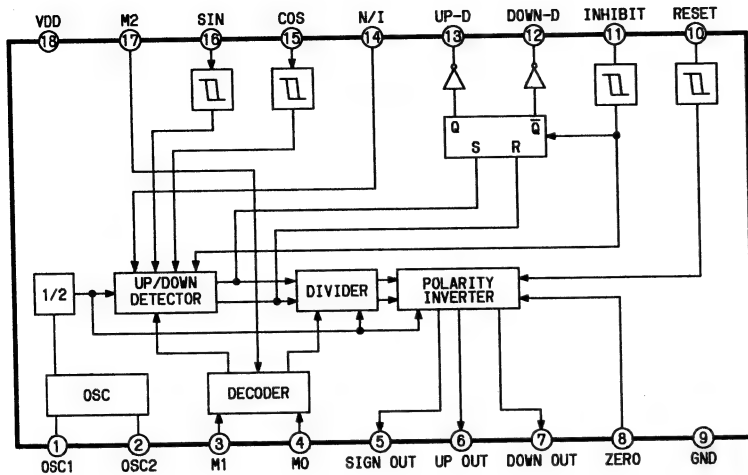


1 12

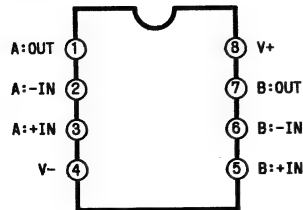
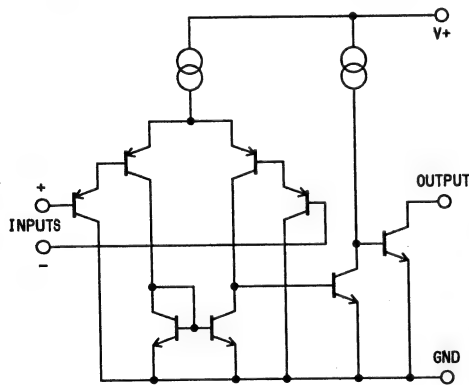
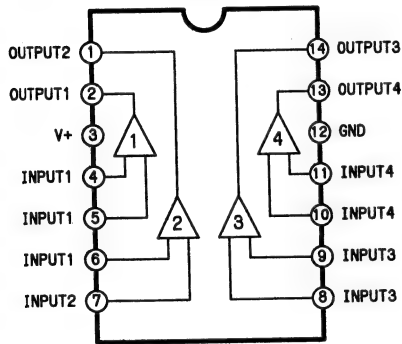
1,11,12 EMITTER
2,4,5,7,8,10 BASE
3,6,9 COLLECTOR

Pin Number	Function
1	V-
2	LOOP GAIN CONTROL
3	INPUT TO PHASE COMPARATOR FROM VCO
4	LOOP FILTER
5	LOOP FILTER
6	FM RF INPUT
7	BIAS FILTER
8	GND
9	VCO OUTPUT TTL
10	V+
11	VCO OUTPUT2
12	FREQ.SET CAP.
13	FREQ.SET CAP.
14	ANALOG OUTPUT
15	HYSTERISIS SET
16	TTL OUTPUT

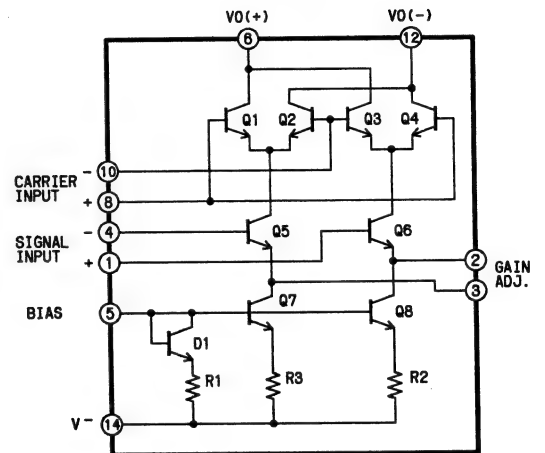
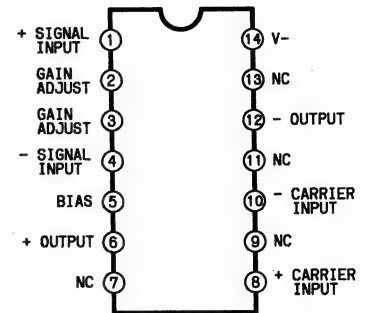
MSM5210RS (UP/DOWN COUNTER)



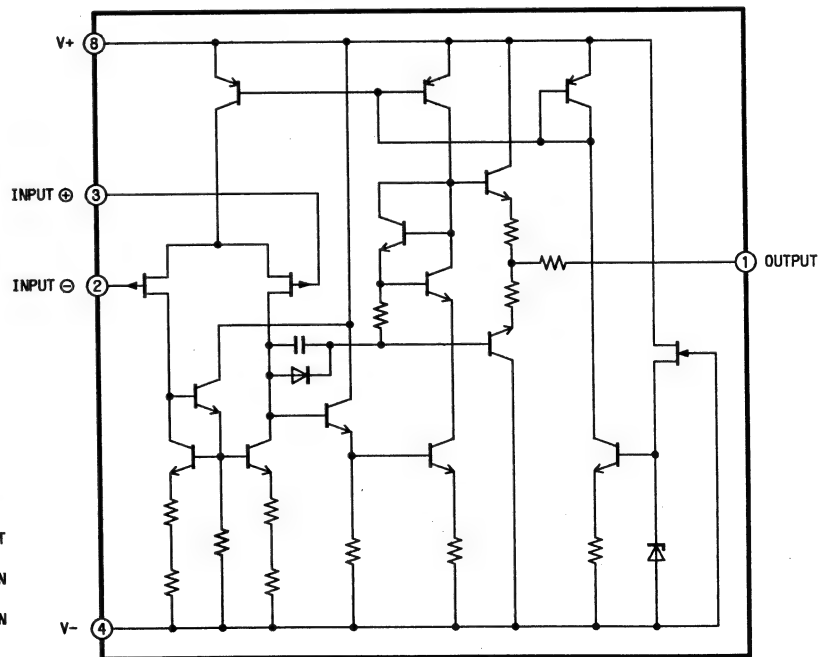
NJM2901
(QUAD VOLTAGE COMPARATOR)
(TOP VIEW)



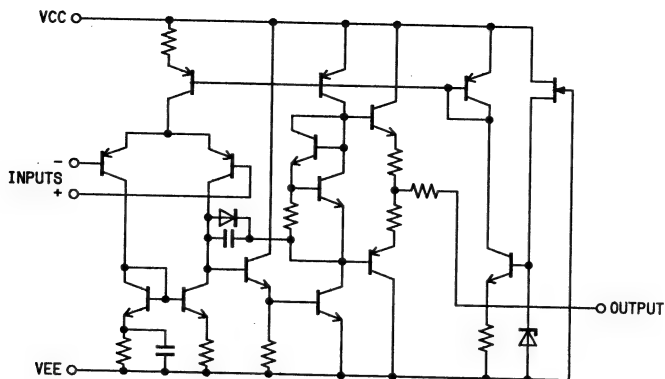
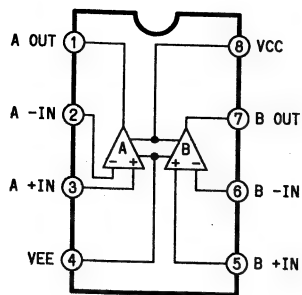
NJM1406
(BALANCED MODULATOR/DEMODULATOR)



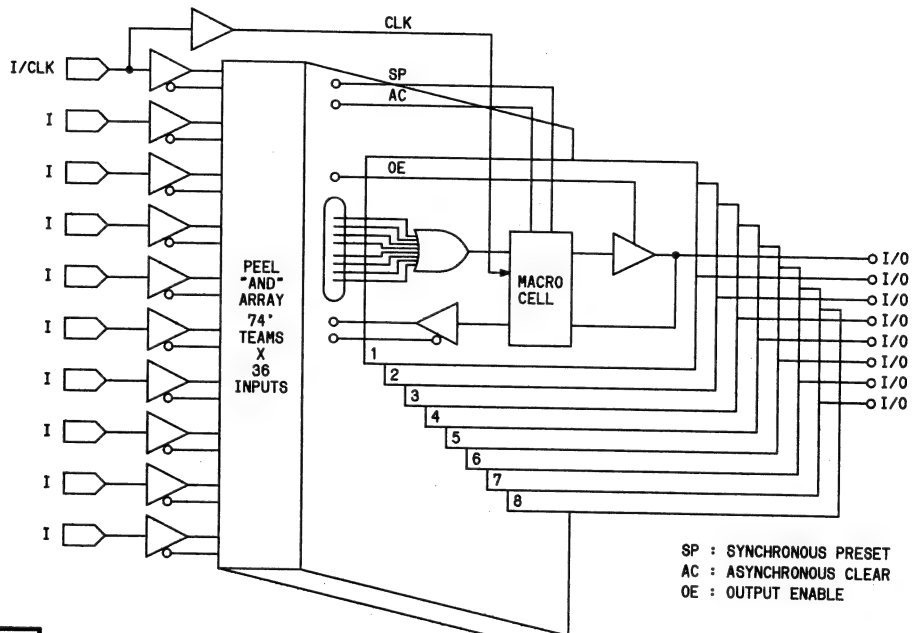
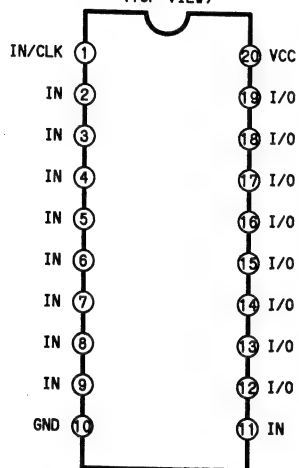
NJM082BM
(OPERATIONAL AMPLIFIER)



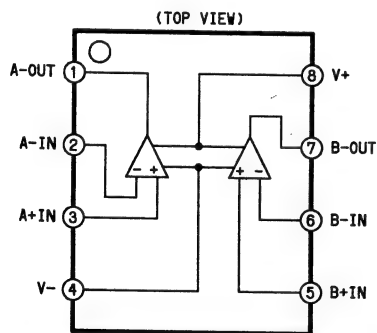
NJM4558
(OPERATIONAL AMPLIFIER)
(TOP VIEW)



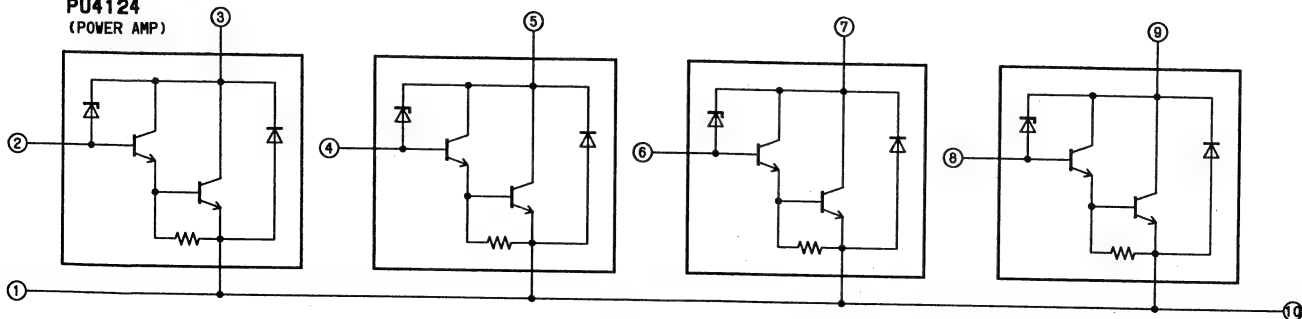
PEEL18CV8 (C-MOS EPROM)
(TOP VIEW)



NJM5532
(2 CIRCUIT LOW NOISE AMP)



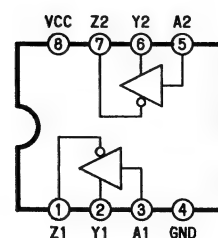
PU4124
(POWER AMP)



(TOP VIEW)

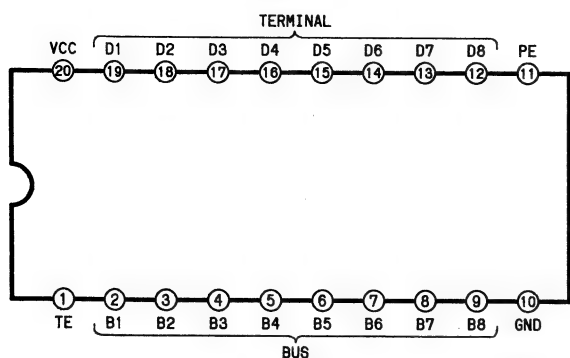


(TOP VIEW)



8N75160 (GPI INTERFACE)

(TOP VIEW)



(FUNCTION TABLES)
DRIVERS

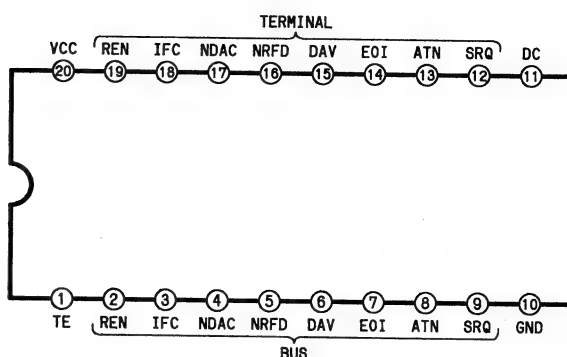
INPUTS			OUTPUT B
D	TE	PE	B
H	H	H	H
L	H	H	L
H	X	L	F
L	H	L	L
X	L	X	F

RECEIVERS

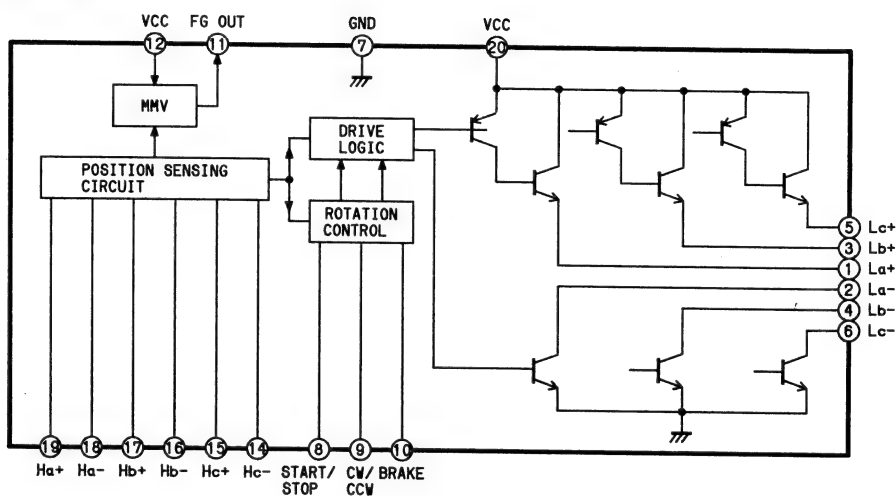
B	TE	PE	OUTPUT D
D	TE	PE	D
L	L	X	L
H	L	X	H
X	H	X	Z

8N75161 (GPI INTERFACE)

(TOP VIEW)

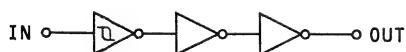
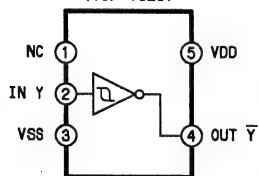


TA7712 (MOTOR CONTROL IC)



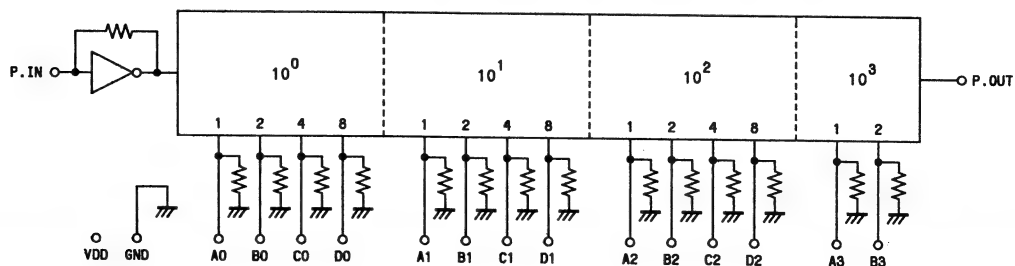
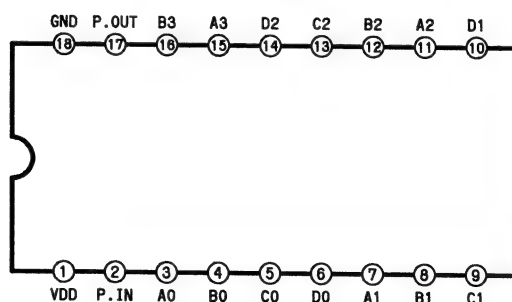
TC48584F (SCHMITT TRIGGER)

(TOP VIEW)

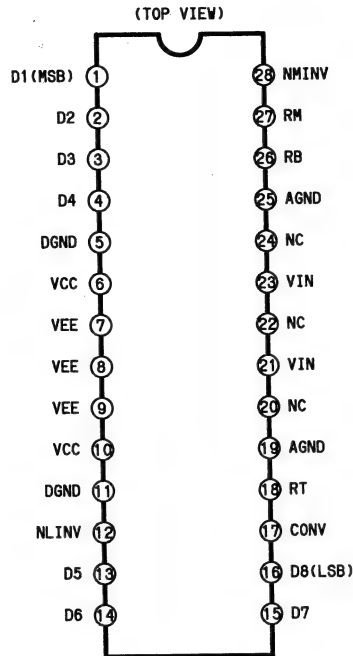
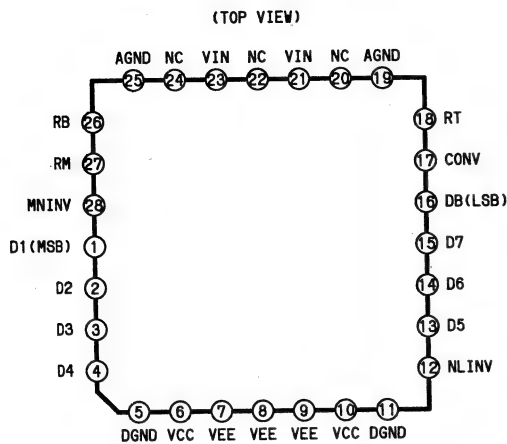


TC9122P (HIGH SPEED BCD PROGRAMMABLE COUNTER)

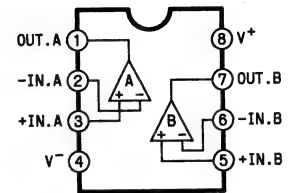
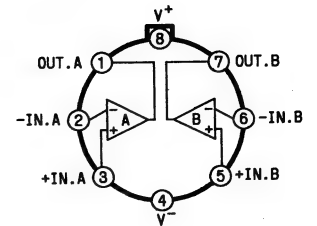
(TOP VIEW)



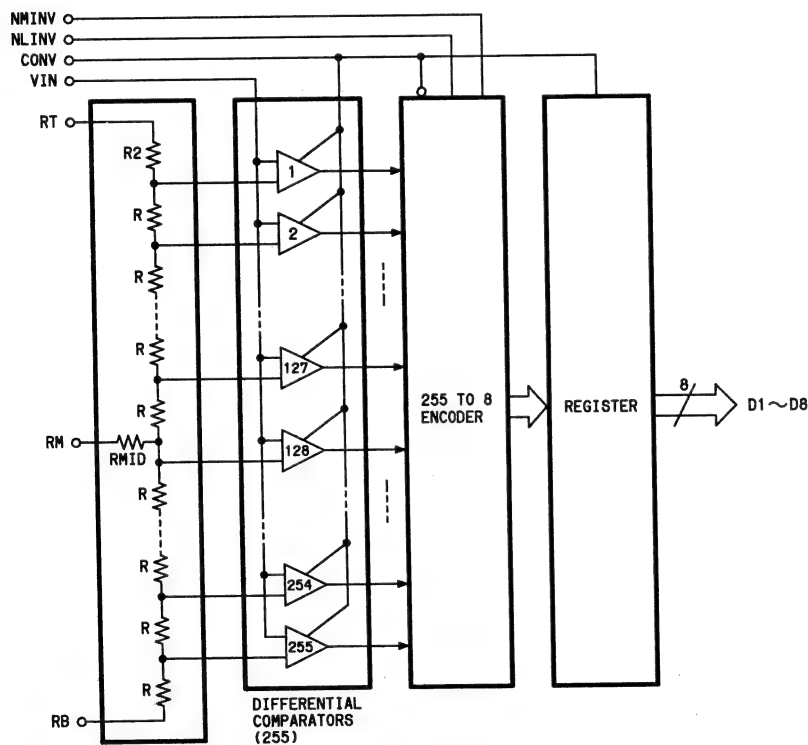
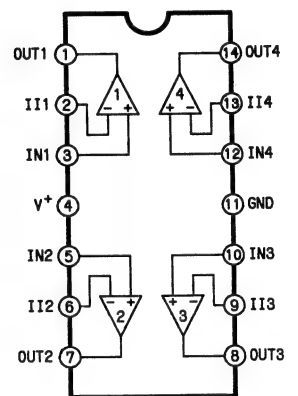
TDC1038
(MONOLITHIC VIDEO A/D CONVERTER)



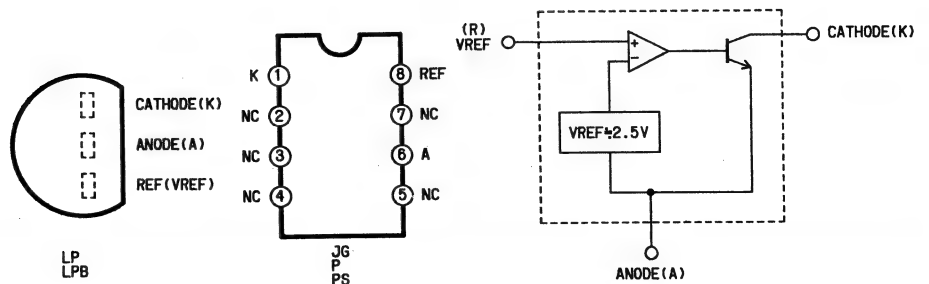
TL082
(OPERATIONAL AMPLIFIER)
(TOP VIEW)



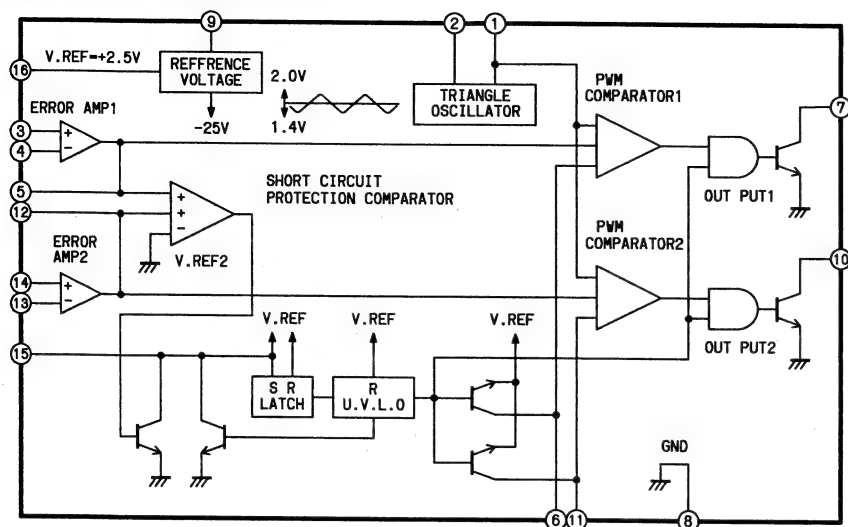
TL084
(OPERATIONAL AMPLIFIER)
(TOP VIEW)



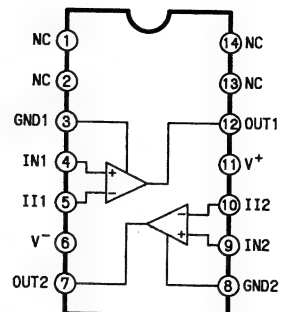
TL431
(ADJUSTABLE PRECISION SHUNT REGULATOR)



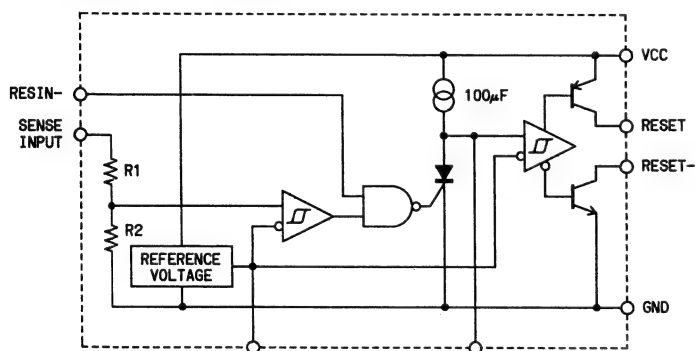
TL1451CNS
(DUAL SWITCHING REGULATOR CONTROLLER)



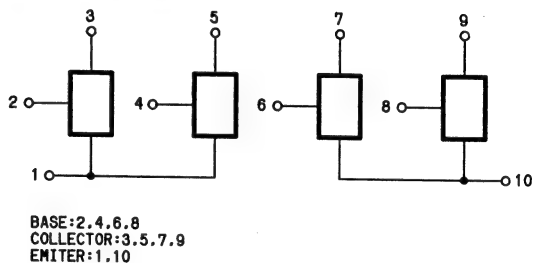
UPC319
(DUAL COMPARATOR)
(TOP VIEW)



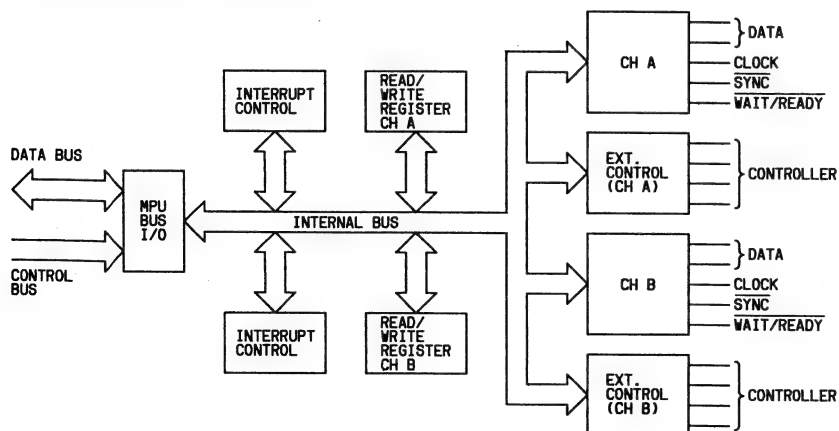
TL7705
(SUPPLY VOLTAGE SUPERVISOR CIRCUIT)



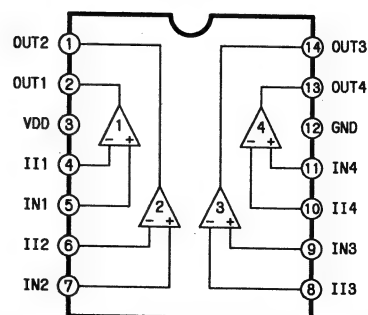
µPA1453H
(POWER TRANSISTOR ARRAY)



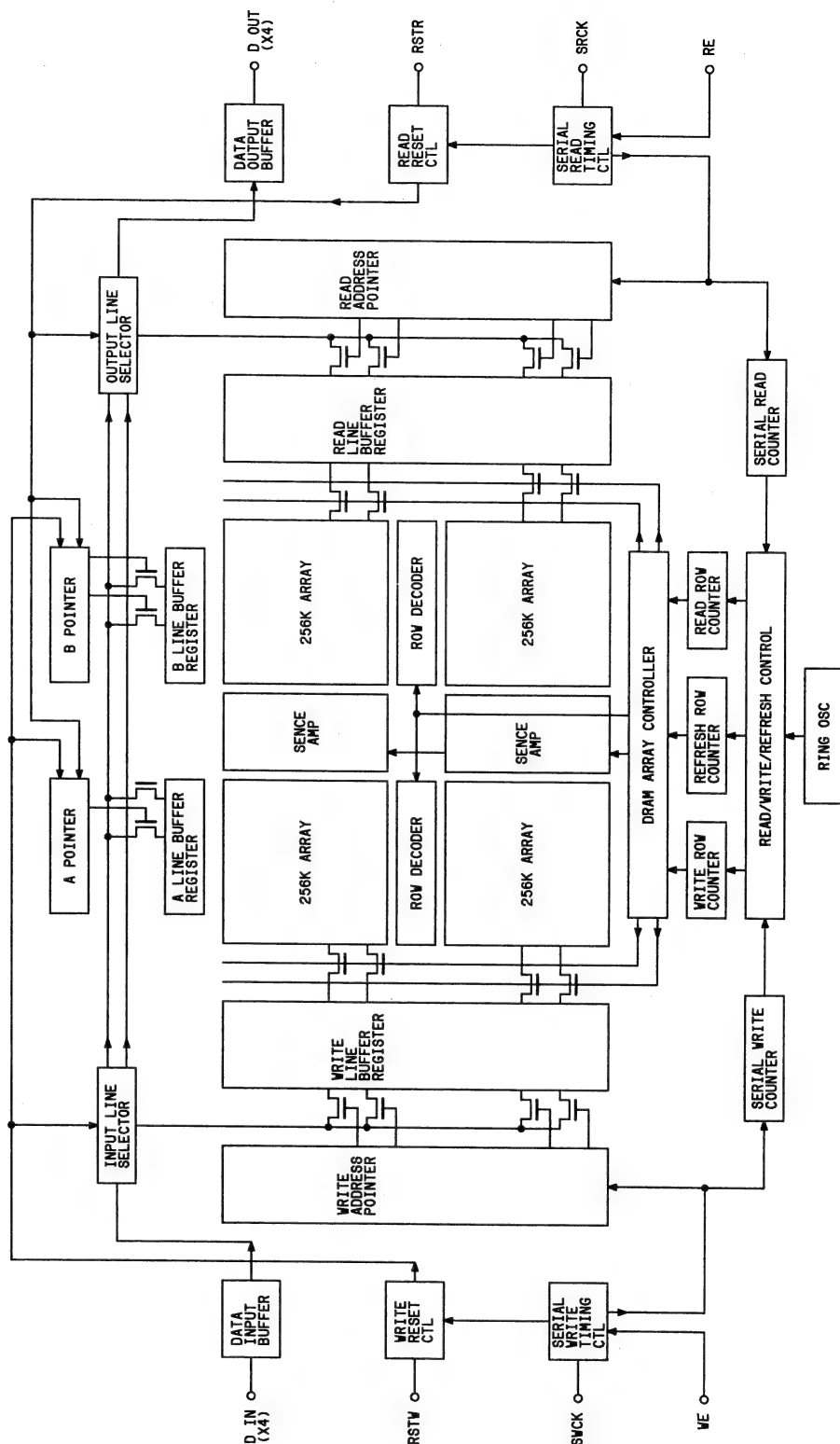
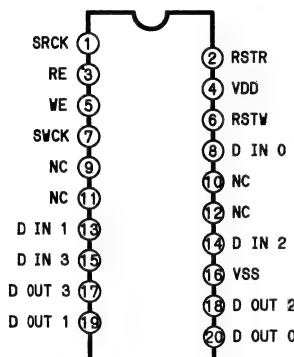
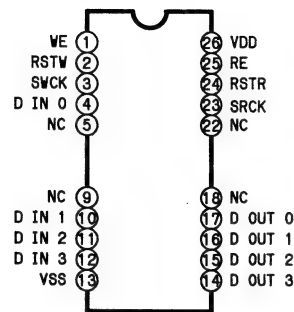
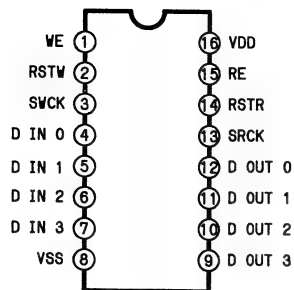
TMPZ84C43AF6
(SERIAL INPUT/OUTPUT CONTROLLER)



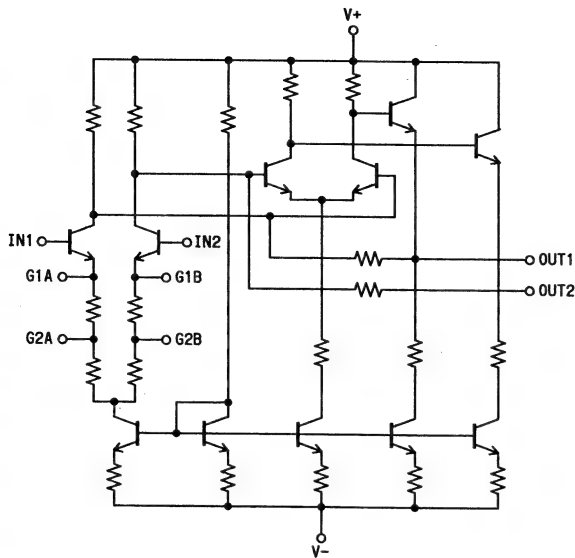
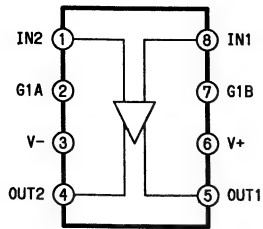
UPC339
(OPERATIONAL AMPLIFIER)
(TOP VIEW)



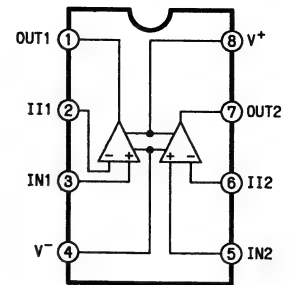
TMS4C1060 (CONCEALMENT CONTROL)
(262,144 WORDS×4BIT-FIELD-MEMORY)



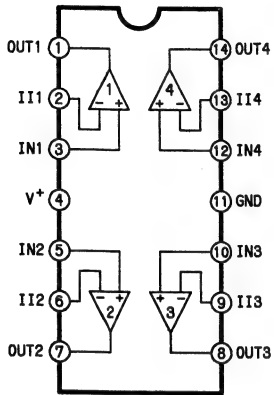
μPC1663



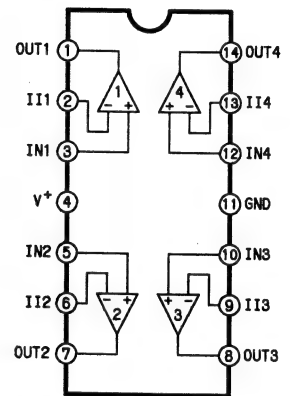
UPC393 (DUAL SINGLE-SUPPLY OPERATIONAL AMPLIFIER) (TOP VIEW)



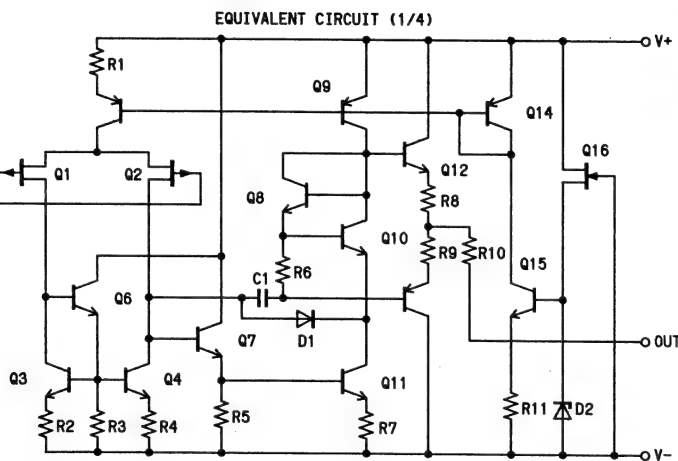
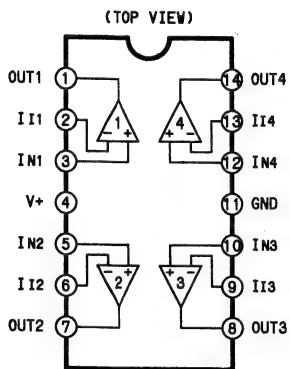
UPC451 (HIGH PERFORMANCE QUADRUPLE OPERATIONAL AMPLIFIER) (TOP VIEW)



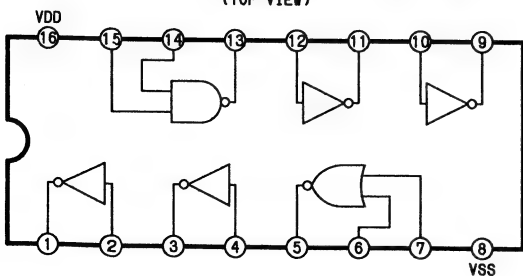
UPC4741 (OPERATIONAL AMPLIFIER) (TOP VIEW)



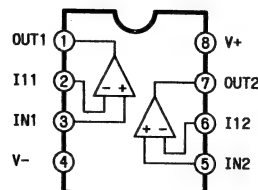
μPC4074



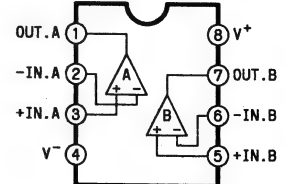
UPC4572 (4 INVERTERS PLUS 2-INPUT NOR GATE PLUS 2-INPUT NAND GATE) (TOP VIEW)



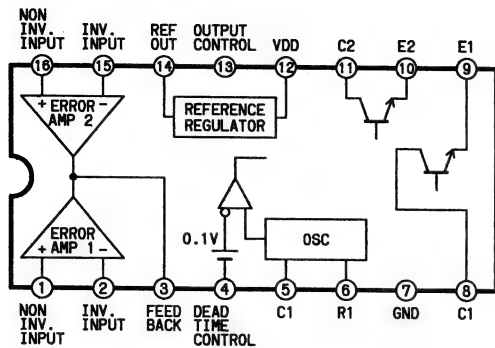
UPC4558 (OPERATIONAL AMPLIFIER) (TOP VIEW)



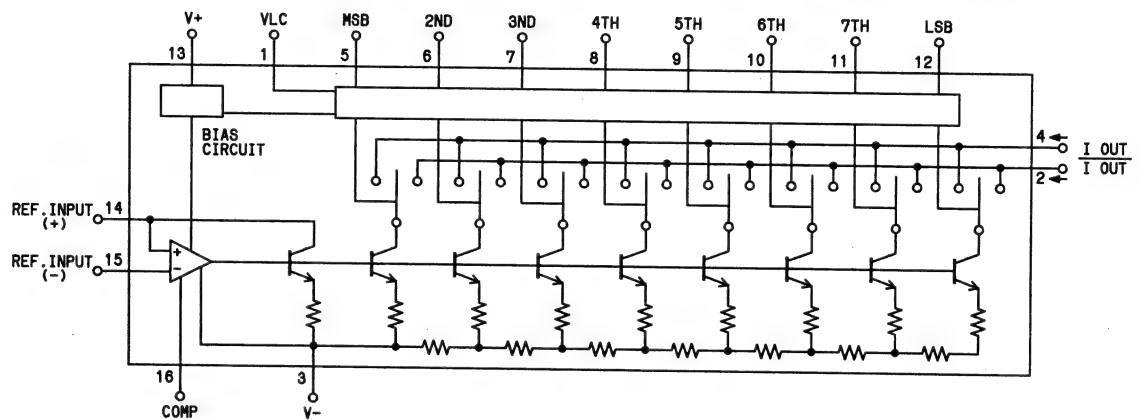
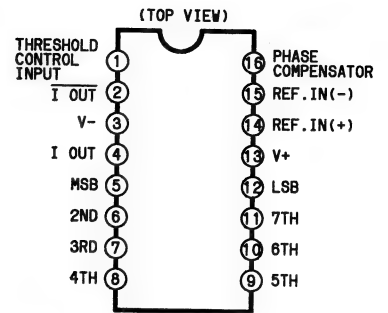
UPC4082 (OPERATIONAL AMPLIFIER) (TOP VIEW)



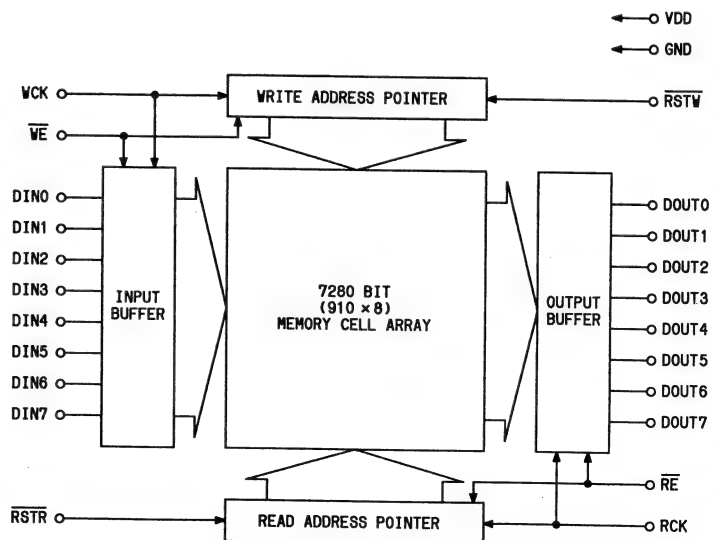
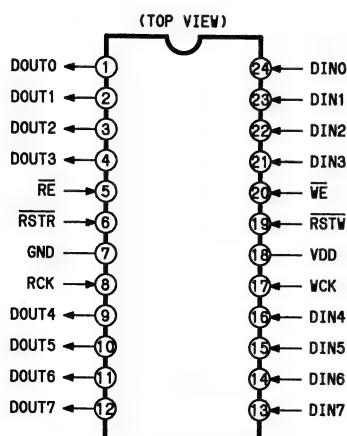
μPC4946
(SWITCHING REGULATOR CONTROL)



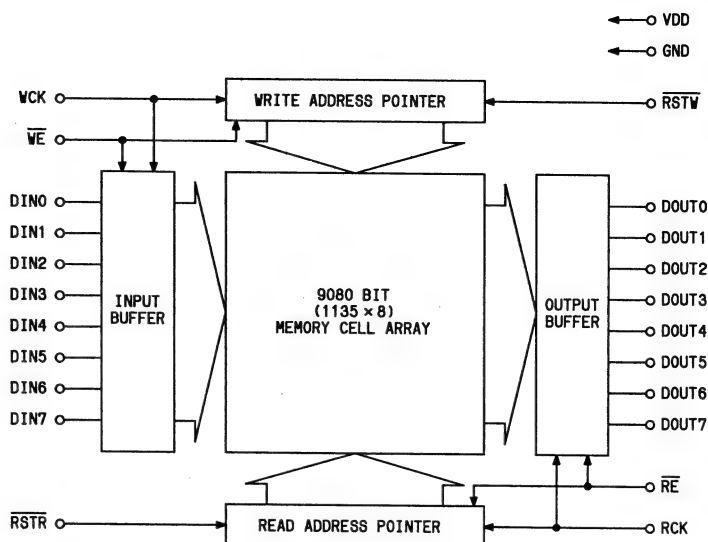
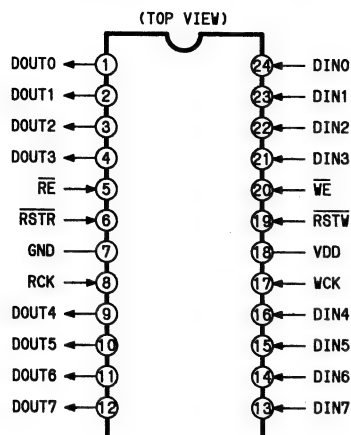
μPC624C
(18-PIN HERMETIC DIP)



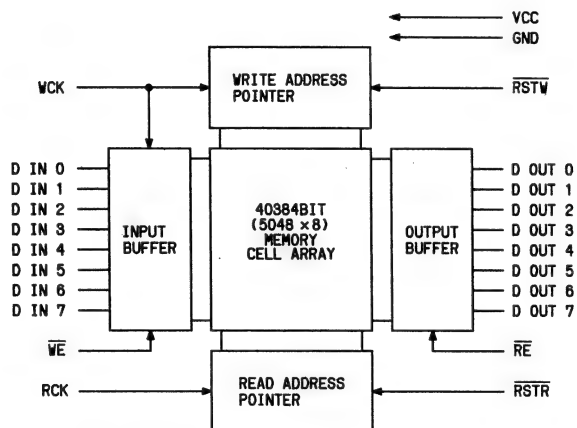
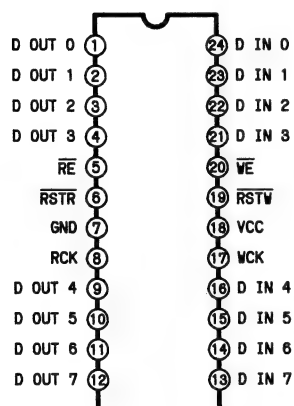
μPD421016 (FIFO 1H DELAY)



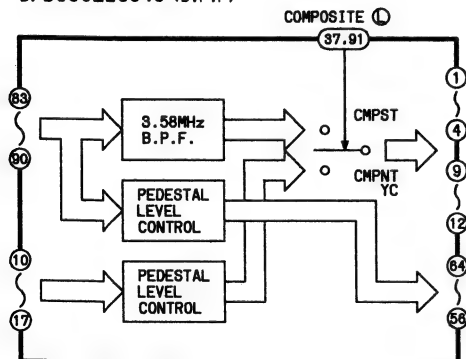
μPD421026 (FIFO 1H DELAY)



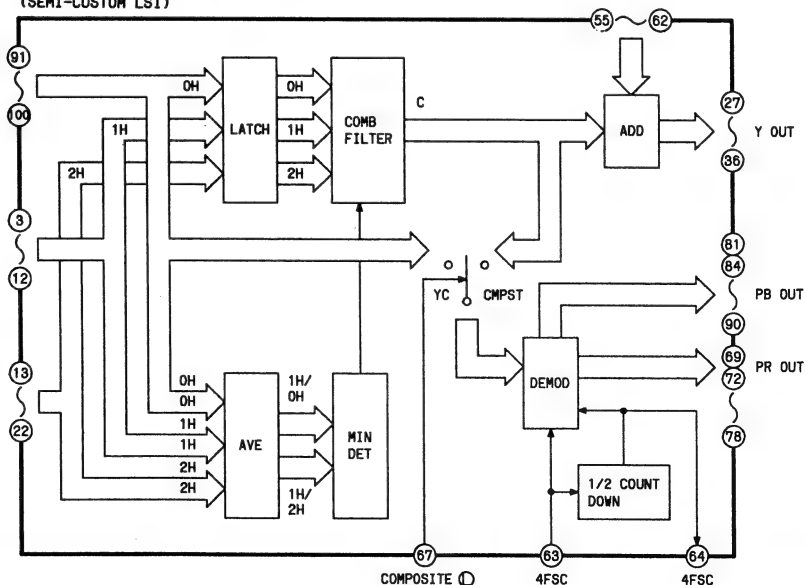
μPD42505C-50 (HIGH SPEED LINE BUFFER)
(TOP VIEW)



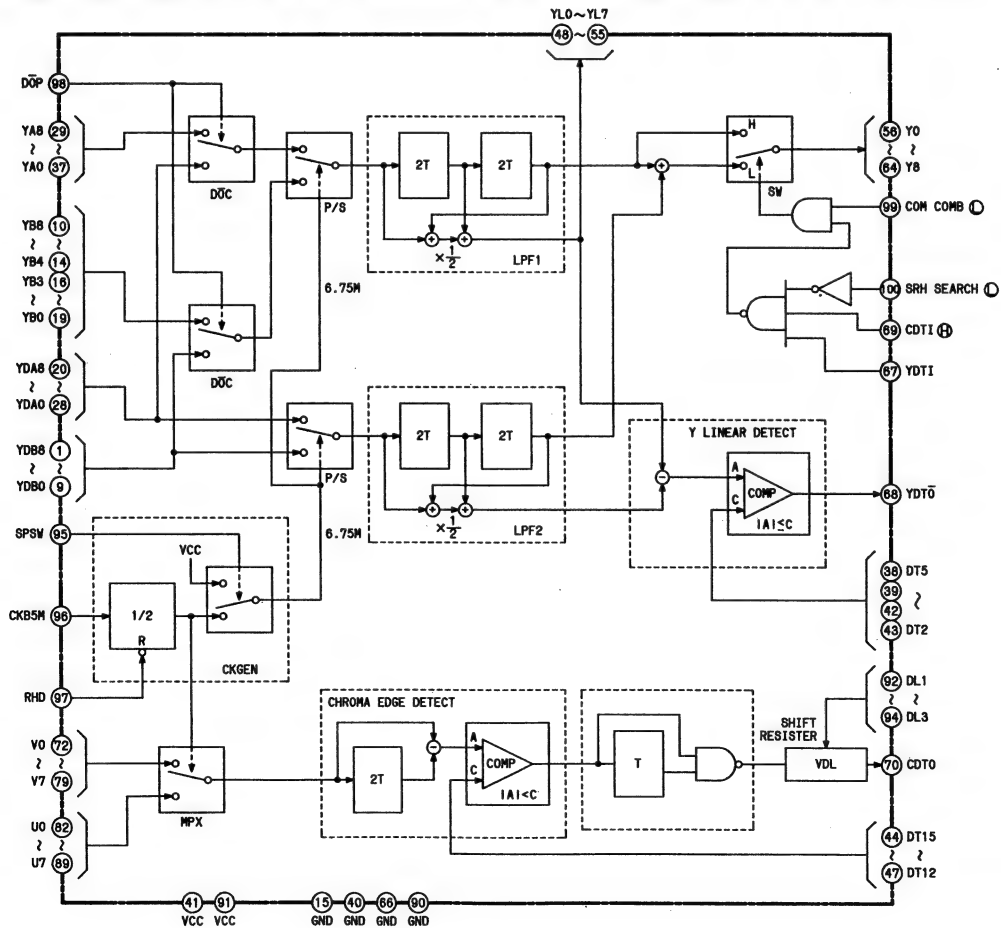
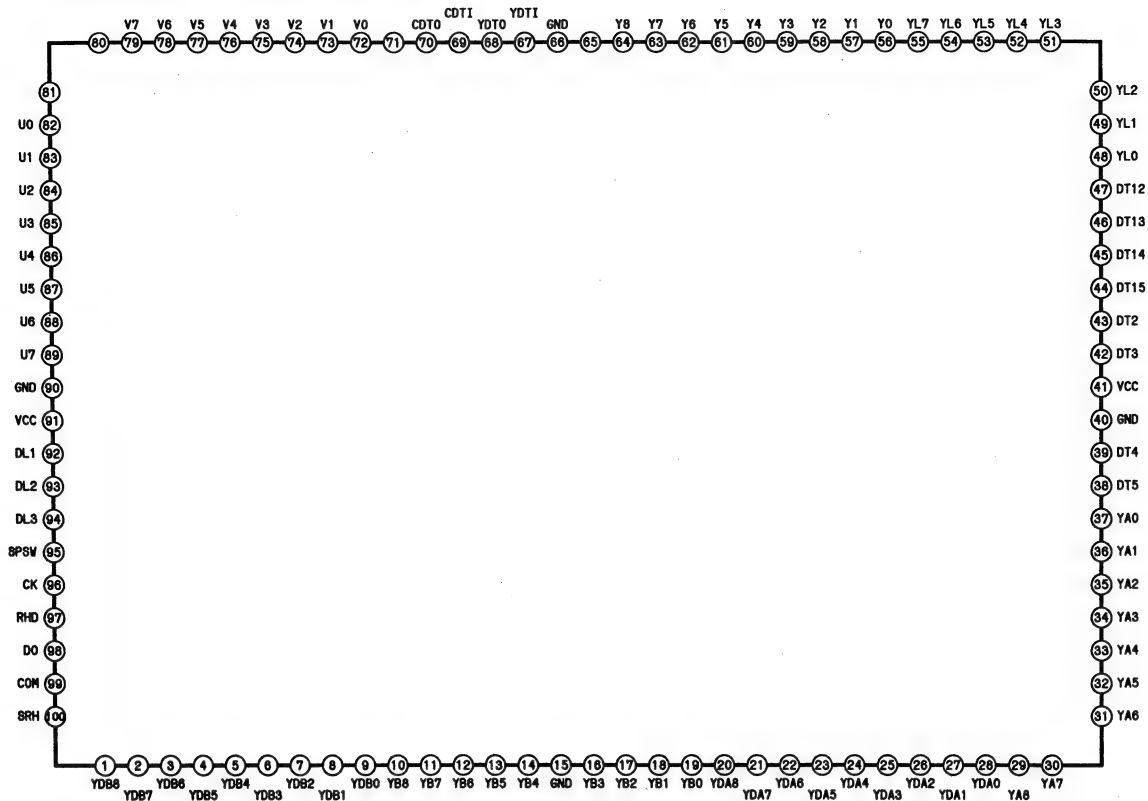
UPD650226046 (B.P.F.)



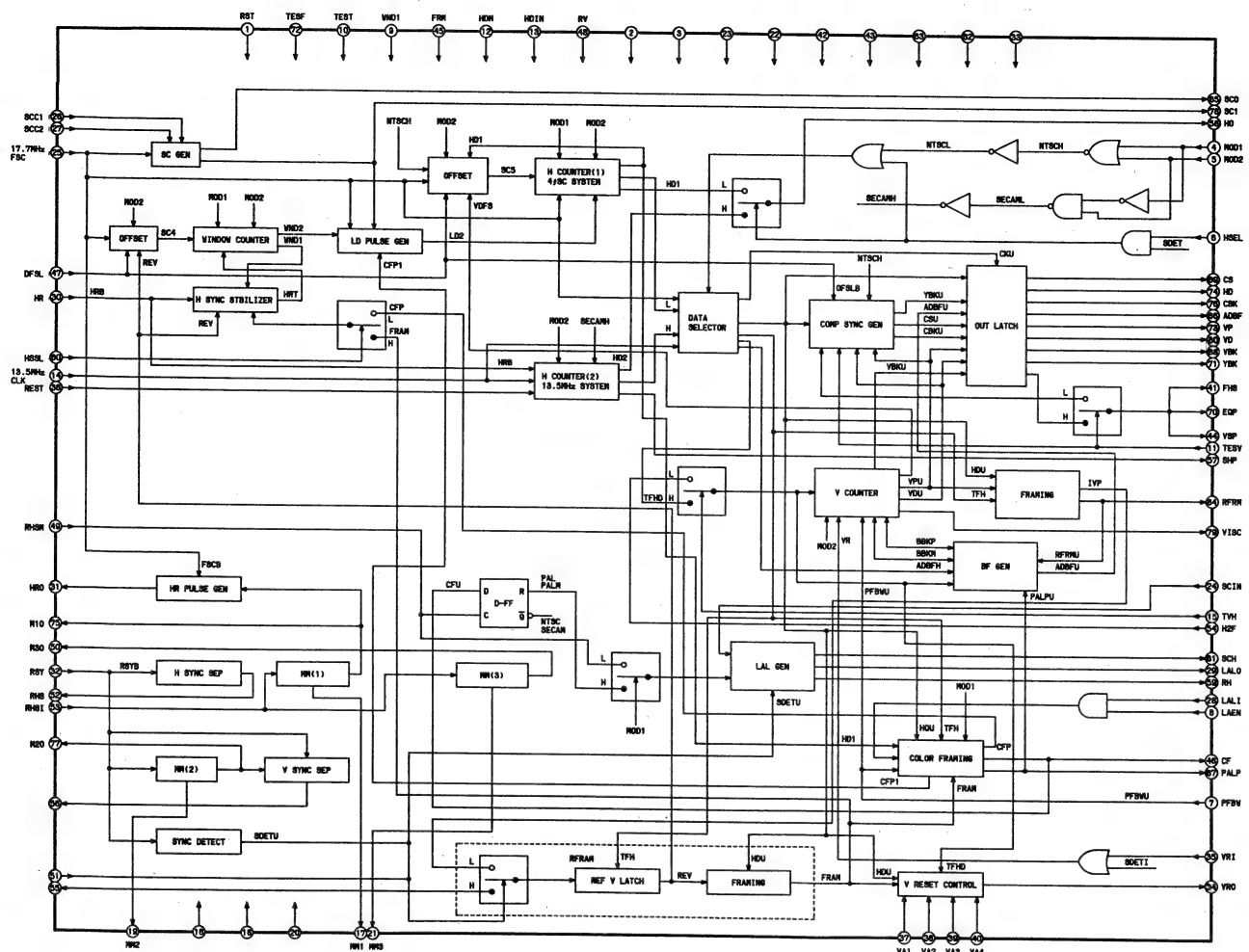
μPD650426024 (Y/C SEPARATION)
(SEMI-CUSTOM LSI)



μPD65013F101 (1H/2H DELAY FOR Y/C SEPA)



μPD65022F210 (C-MOS GATE ARRAY)



PIN NO.	SYMBOL	I/O	DESCRIPTIONS	PIN NO.	SYMBOL	I/O	DESCRIPTIONS
1	RST	I	TEST TERMINAL	41	FHS	I/O	H SYNC OUT(1H)
2	VDD	—	VDD 5V	42	VDD	—	VDD 5V
3	GND	—	GND	43	GND	—	GND
4	N001	I	TV MODE SELECT(SHOWN IN TABLE1)	44	VSP	I/O	V SERRATION PULSE(2H)
5	N002	I	TV MODE SELECT(SHOWN IN TABLE1)	45	FRM	I	TEST TERMINAL
6	HSEL	I	MAIN CLOCK SELECT(SHOWN IN TABLE2)	46	CF	O	CF SIGNAL OUTPUT
7	PFWM	I	PAL-CF RESET NTSC-Y BLANKING WITH SELECT	47	DFSL	I	NTSC-YBK SELECT PAL-OFFSET
8	LAEN	I	L-LINE ALTERNATE PULSE ENABLE INPUT	48	RV	I	TEST TERMINAL
9	WM1	I	HI-IMABLE LO-UNIMABLE	49	RHSN	I	LUTCH PULSE INPUT(FOR CF DET)
10	TEST	I	TEST TERMINAL	50	NSO	O	NMS OUT
11	TESV	I	TEST TERMINAL	51	SBK1	O	REF SYNC (RSY) DETECT
12	HDW1	I	TEST TERMINAL	52	RHS	O	REF H SIGNAL
13	HDIN	I	TEST TERMINAL	53	RHS1	I	REF H SYNC INPUT
14	CLK	I	13.5MHz CLOCK INPUT	54	H2F	I	2HD INPUT(TVH:LO ONLY)
15	TVH	I	V COUNTER CLOCK SELECT	55	RHS	I	V SYNC INPUT
16	GND	—	L-H2F EXT H-2HD INT(OR OPEN)	56	RYSD	O	V SYNC SEPARATOR OUTPUT
17	WM1	I/O	CR CONNECTION FOR WM1	57	SHP	O	SAMPLE HOLD PULSE
18	GND	—	GND(FOR W.N.)	58	HO	O	SIGNAL FOR MAKING TRAPEZOID WAVE(1H)
19	WM2	I/O	CR CONNECTION FOR WM2	59	RH	O	DELAYED "RHSN" PULSE(FOR PAL CF)
20	GND	—	GND(FOR W.N.)	60	HSEL	I	H SYNC STABILITY CIRCUIT SENSITIVITY SELECT
21	WM3	I/O	CR CONNECTION FOR WM3	61	SCH	O	CF DET HALF-Function PREVENTION PULSE
22	GND	—	GND(FOR W.N.)	62	GND	—	HI-MOR-LO-HAL
23	VDD	—	VDD 5V	63	VDD	—	VDD 5V
24	SCIN	I	SUB CARRIER INPUT	64	RFRN	O	FRANKING SIGNAL HI-ODD,LO-EVEN
25	FSC	I	4/9C CLOCK INPUT	65	SCO	O	SUB CARRIER OUT
26	SCC1	I	SC1 PHASE CONTROL INPUT	66	ADRN	O	ADVANCED BURST FLAG(1H)
27	SCC2	I	SC2 PHASE CONTROL INPUT	67	PALP	O	PAL PULSE OUTPUT(1H/2)
28	LAL1	I	L-LINE ALTERNATE PULSE INPUT	68	VBK	O	V BLANKING SIGNAL
29	LAL2	I	L-LINE ALTERNATE PULSE INPUT	69	CS	O	COMPOSITE SYNCHRONIZING SIGNAL
30	NR	I	H COUNTER RESET(4/9C) INPUT	70	EQP	I/O	EQUALIZING PULSE(2H)
31	NR2	O	H COUNTER RESET(4/9C) OUTPUT	71	YBK	O	B/Y CONTROL PULSE
32	RSY	I	REFERENCE SYNC INPUT	72	TESF	I	TEST TERMINAL
33	GND	—	GND	73	VP	O	VP PULSE
34	YR0	O	Y COUNTER RESET OUTPUT	74	HD	O	HD PULSE(2H)
35	YR1	I	Y COUNTER RESET INPUT	75	R10	O	NR1 OUT
36	NR2	I	H COUNTER RESET(13.5MHz)	76	CSK	O	COMPOSITE SYNCHRONIZING SIGNAL
37	VA1	I	Y RESET OUTPUT PHASE SELECT	77	R20	O	NR2 OUT
38	VA2	I	Y RESET OUTPUT PHASE SELECT	78	SC1	O	SUB CARRIER OUT
39	VA3	I	Y RESET OUTPUT PHASE SELECT	79	VISC	O	VISC GATE PULSE
40	VA4	I	Y RESET OUTPUT PHASE SELECT	80	VD	O	VD PULSE

N001	N002	TV SYSTEM
0	0	NTSC
0	1	SECAM
1	0	PALN
1	1	PAL

*0---GND
*1---VDD
TABLE1

MODE	SBET	HSEL	CLOCK SIGNAL
NTSC	0	X	SYNC --- FSC HO --- FSC
	1	0	SYNC --- FSC HO --- HS
PAL	0	X	SYNC --- CLK HO --- FSC
	1	0	SYNC --- CLK HO --- HS

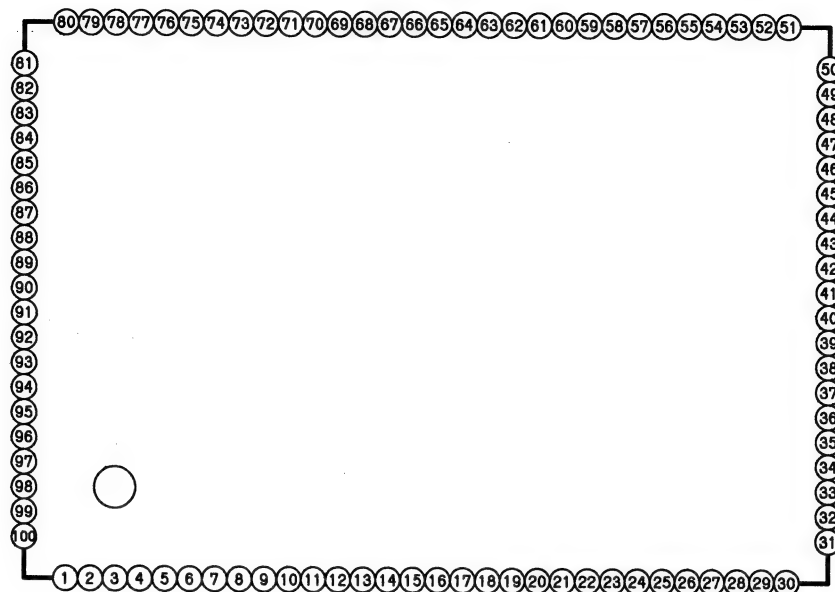
*X IS DON'T CARE
HO --- HO RISING POSITION
TABLE2

VA4	VA3	VA2	VA1	V PHASE
0	0	0	0	0H
0	0	0	1	+1H
0	0	1	0	+2H
0	0	1	1	+3H
0	1	0	0	+4H
0	1	0	1	+5H
0	1	1	0	+6H
0	1	1	1	+8H
1	0	0	0	+10H
1	0	0	1	+12H
1	0	1	0	+14H
1	0	1	1	+16H
1	1	0	0	-4H
1	1	0	1	-3H
1	1	1	0	-2H
1	1	1	1	-1H

*V0 AND VRI --- CONNECTION
*V PHASE REF --- RSY
*--- ADV --- DELAY
TABLE3

μPD65061GF032 (MEMORY CONTROL)

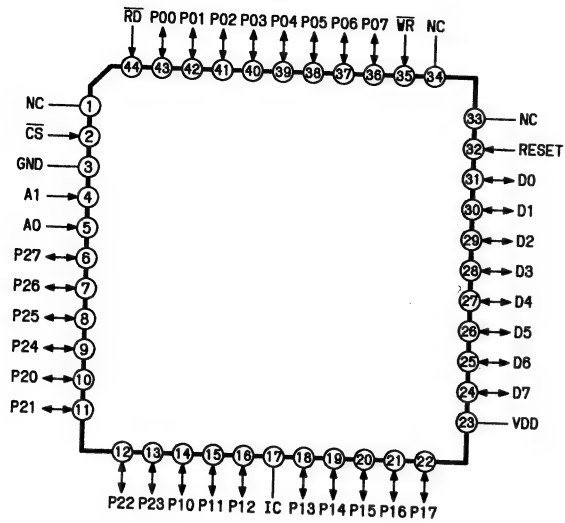
(TOP VIEW)



PIN NO.	PIN NAME	PIN NO.	PIN NAME	PIN NO.	PIN NAME	PIN NO.	PIN NAME
1	GND	26	COUN	51	M1VN	76	A116
2	VDD	27	A00	52	VDD	77	N.C.
3	PAL	28	GND	53	GND	78	TEST
4	LINR	29	VDD	54	A10	79	VDD
5	A016	30	MOWN	55	C1UN	80	GND
6	A015	31	FSC2	56	C1LN	81	M1RN
7	A014	32	OSTN	57	A11	82	ADLD
8	A012	33	FSTN	58	A110	83	OCPA
9	WEON	34	DLO	59	A12	84	SEGO
10	A07	35	DLI	60	OE1N	85	SEG1
11	A013	36	EX0	61	GND	86	FLD0
12	GND	37	EX1	62	A13	87	FLD1
13	A06	38	EX2	63	A111	88	FLD2
14	A08	39	EX3	64	A14	89	CS10
15	A05	40	GND	65	A19	90	CS11
16	A09	41	EX4	66	A15	91	CS12
17	A04	42	EX5	67	A18	92	CS13
18	A011	43	EX6	68	A16	93	CS00
19	A03	44	EX7	69	GND	94	CS01
20	GND	45	EX8	70	A113	95	CS02
21	OEON	46	EX9	71	A17	96	CS03
22	A02	47	EX10	72	WE1N	97	CHON
23	A010	48	EX11	73	A112	98	INTN
24	A01	49	EX12	74	A114	99	WCLK
25	COLN	50	EX13	75	A115	100	MORN

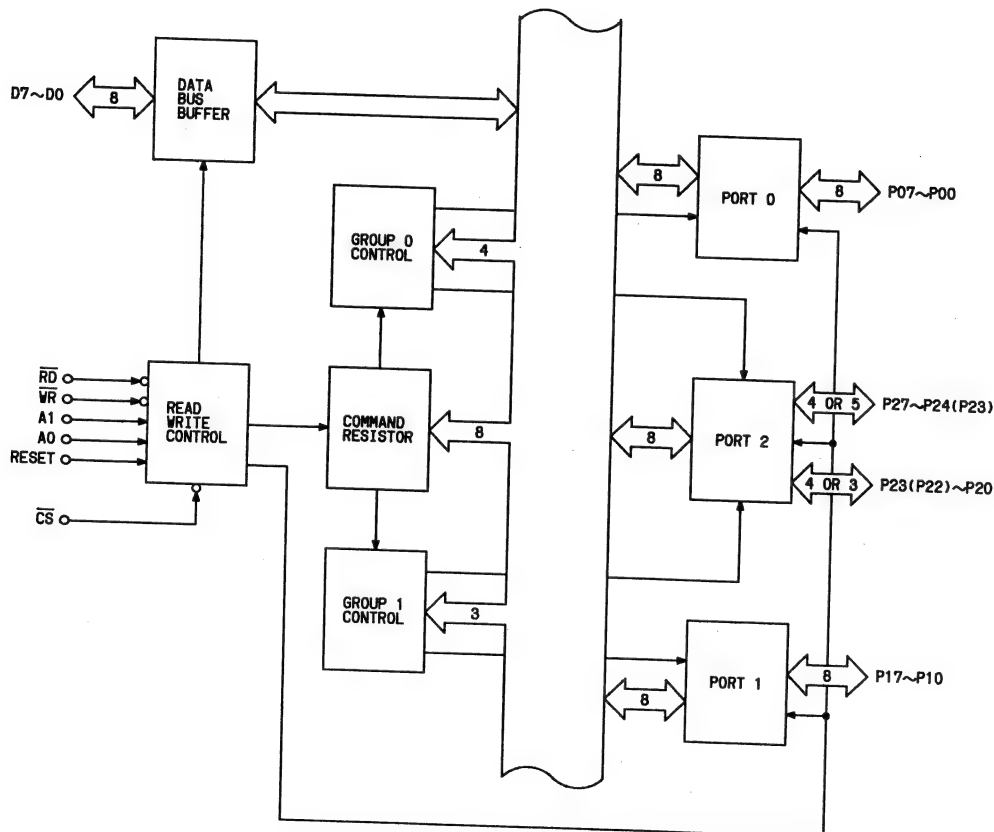
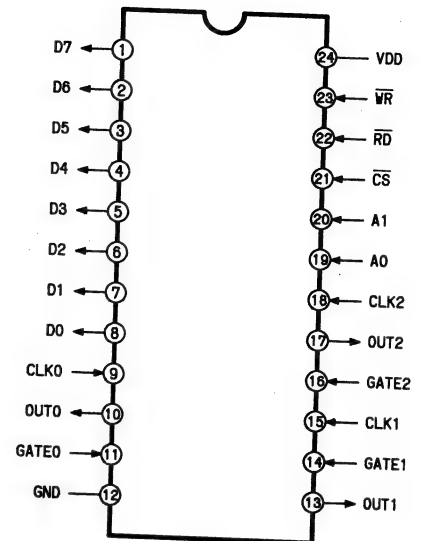
UPD710556

(PARALLEL INTERFACE UNIT)



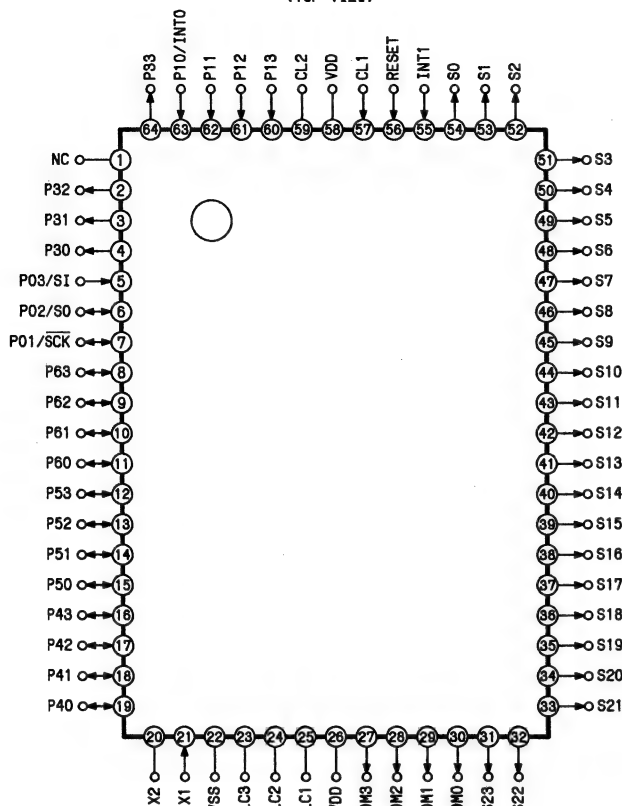
UPD710546

(PROGRAMMABLE TIMER COUNTER)



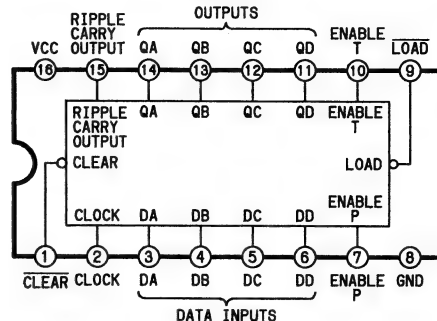
UPD7503G
(4-BIT MICRO COMPUTER)

(TOP VIEW)



74163
(SYNCHRONOUS PRESETTABLE BINARY COUNTER WITH CLEAR)

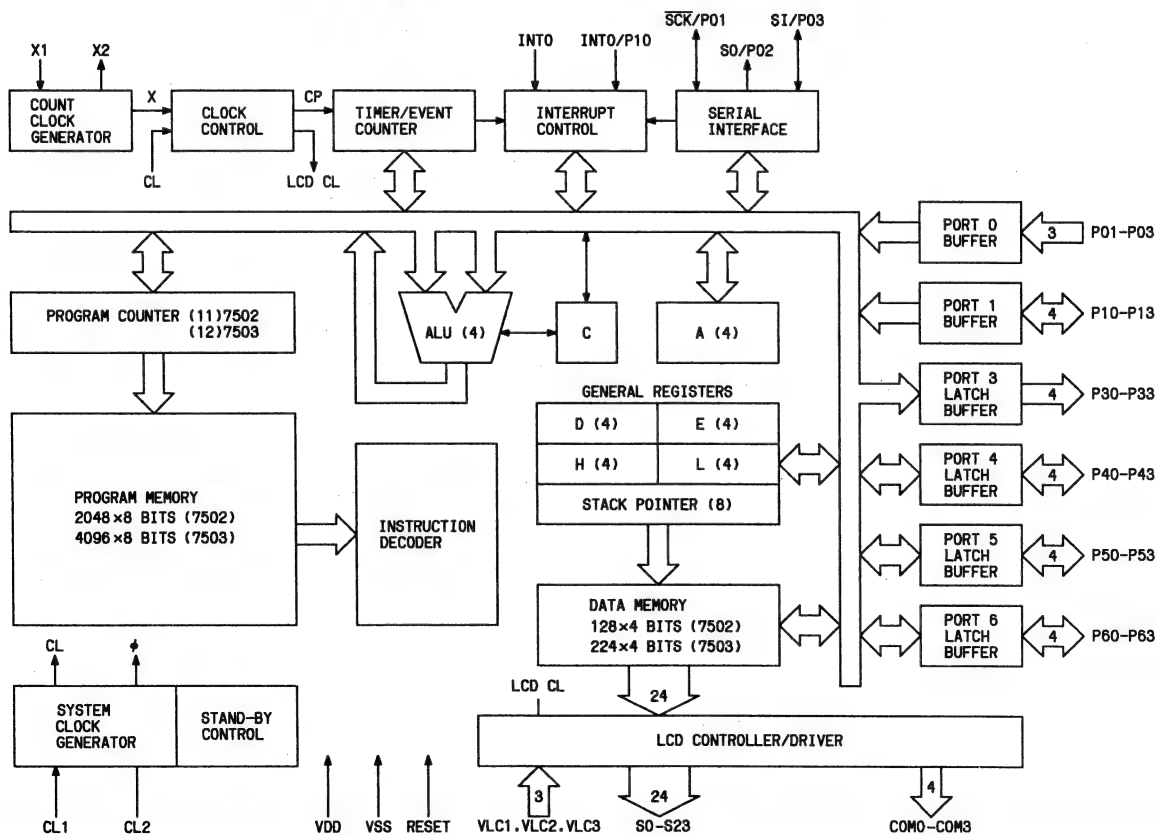
(TOP VIEW)



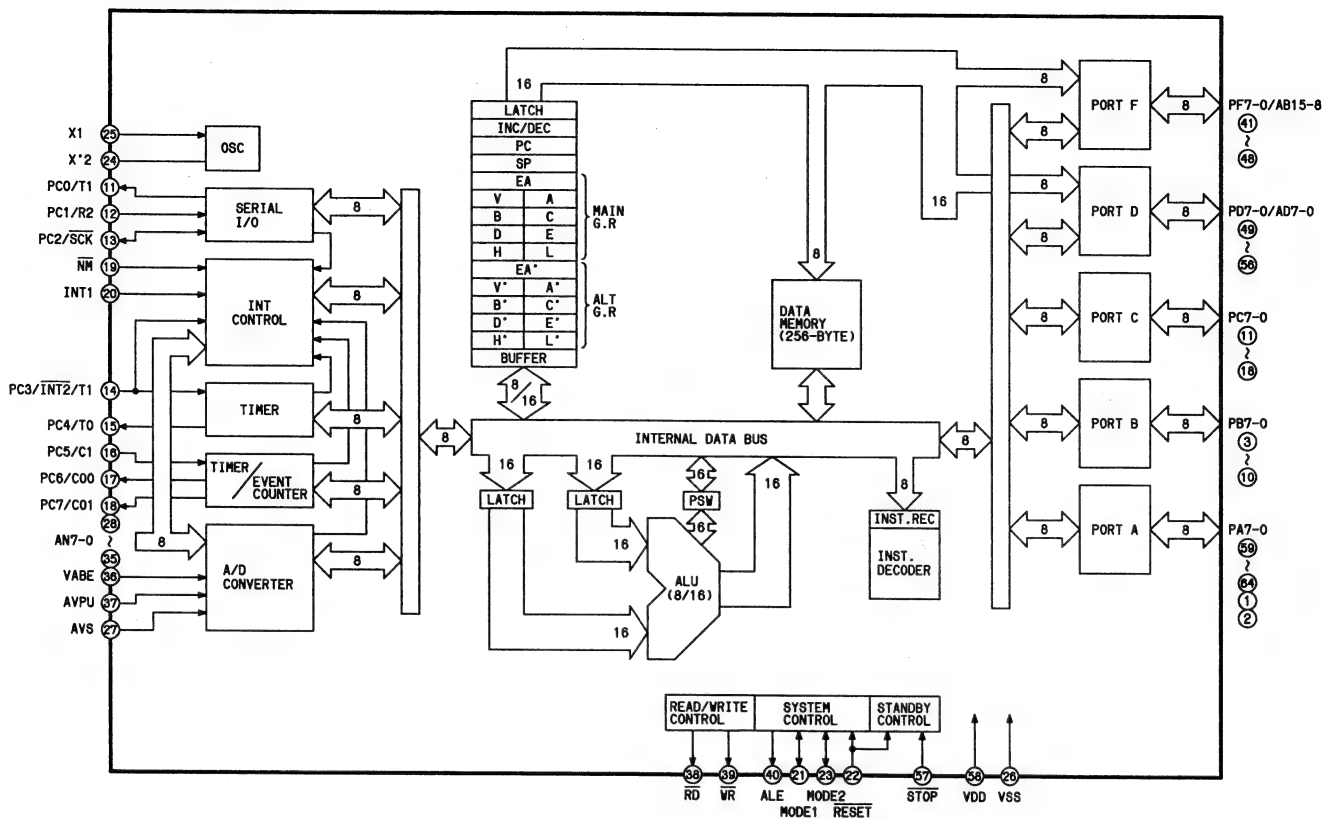
FUNCTION TABLE

INPUT				OUTPUT				FUNCTION
CLEAR	LOAD	CK	ENABLE P T	QA	QB	QC	QD	
H	H		H H	—	—	—	—	COUNT
H	L		X X	DA	DB	DC	DD	DATA SET
L	X		X X	L	L	L	L	CLEAR
X	X	X	X H	H	H	H	H	—

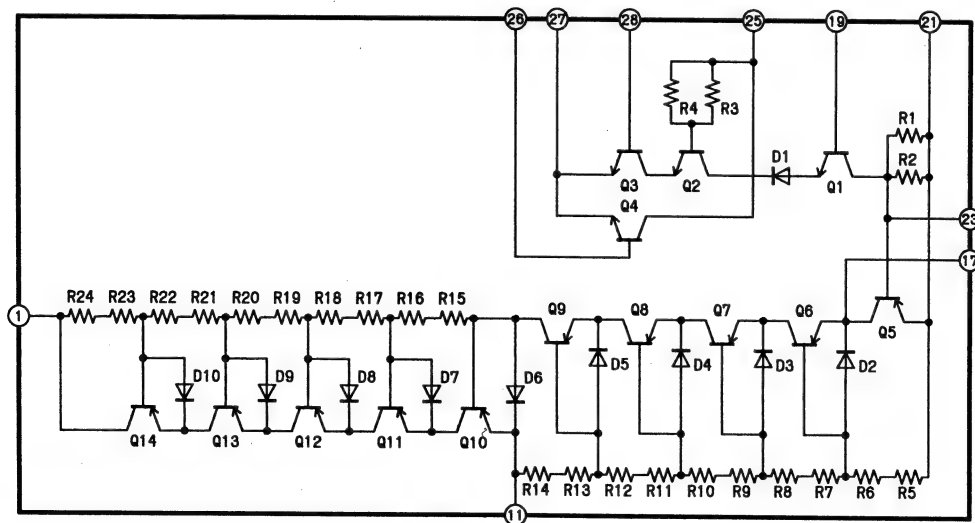
H:HIGH L:LOW X:H or L
n:A~D



UPD78C10G
(8-BIT MICRO COMPUTER)

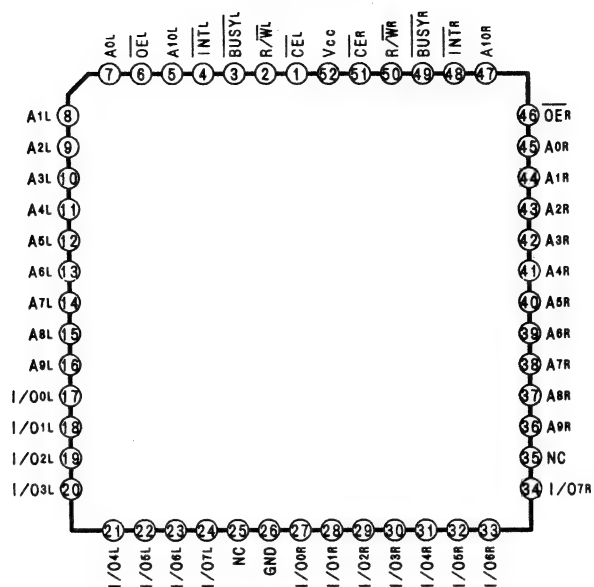


VCR0111
(DRIVE AMPLIFIER)

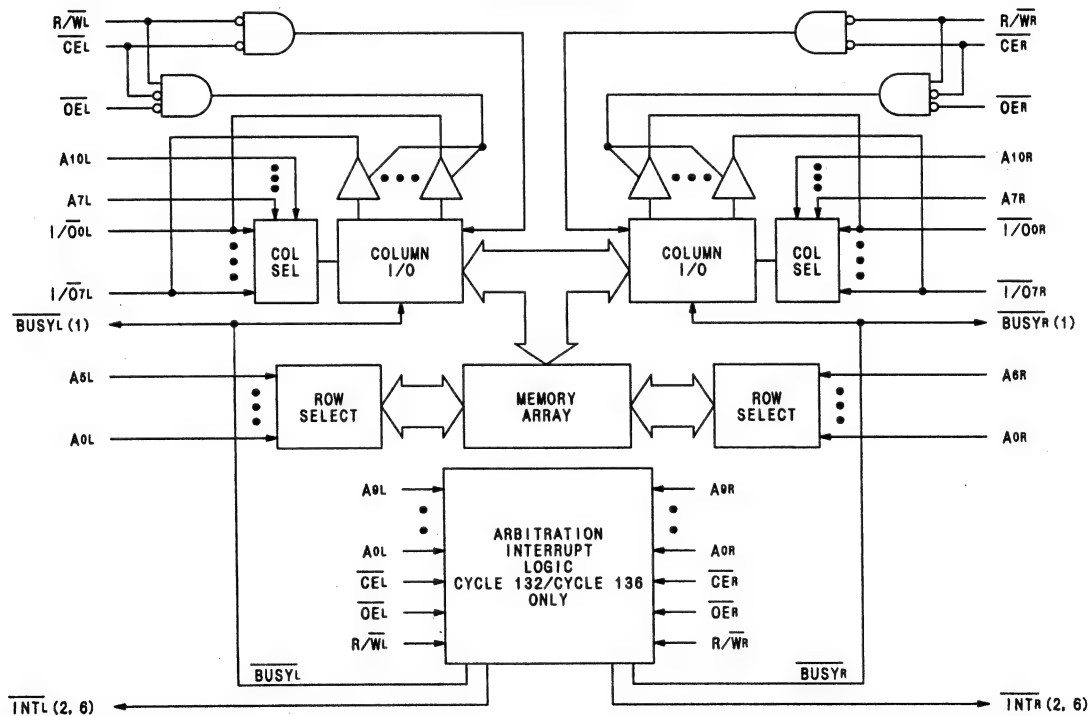


CY7C136-35
(MEMORY IC)

(TOP VIEW)

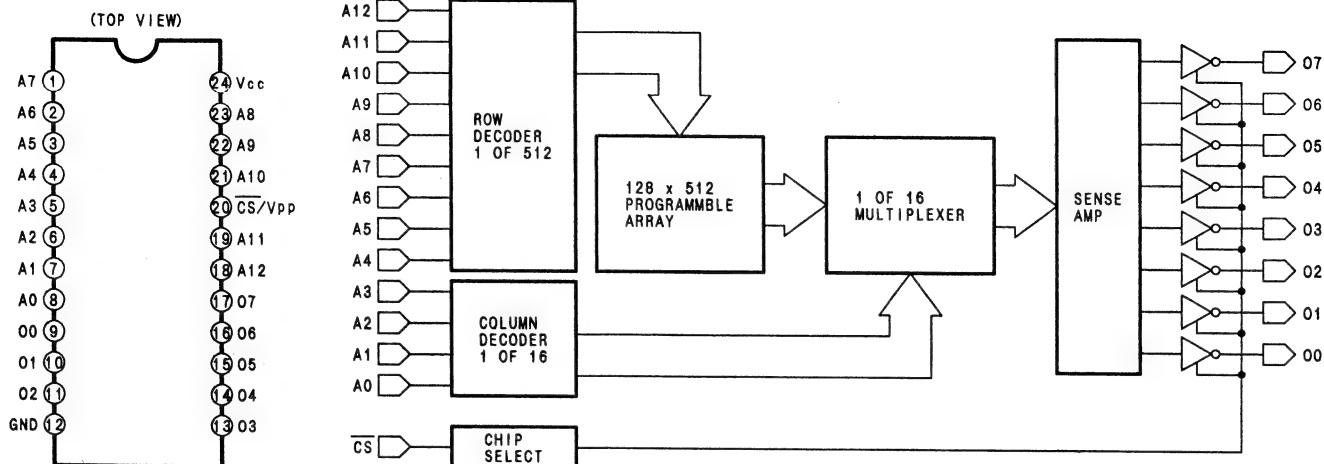


(BLOCK DIAGRAM)



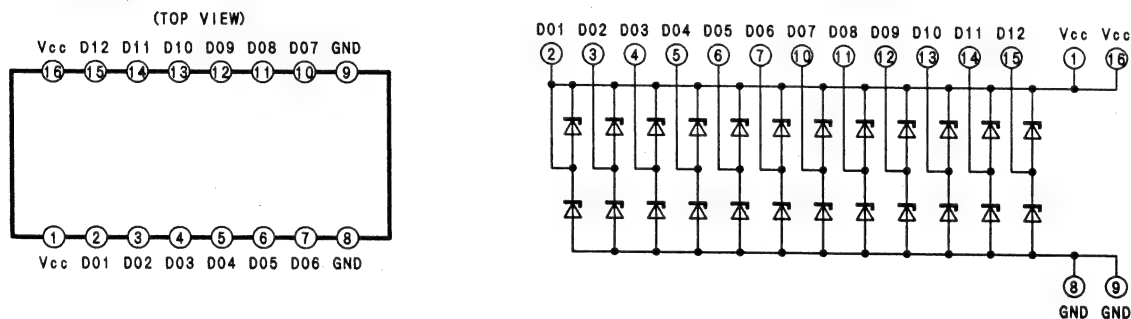
AK27CX642
27CX642
(C MOS EPROM)

(BLOCK DIAGRAM)



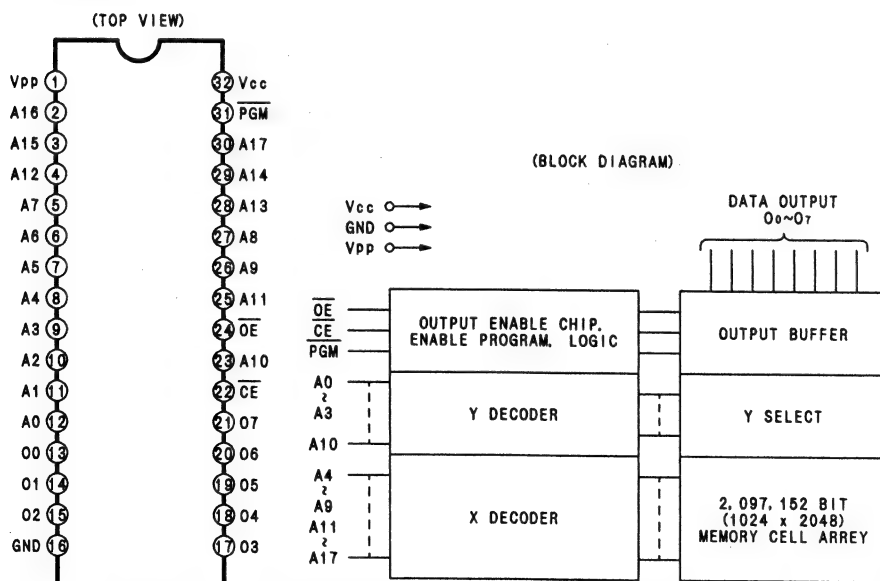
SN74S1051NS
(DIODE ARRAY)

(BLOCK DIAGRAM)

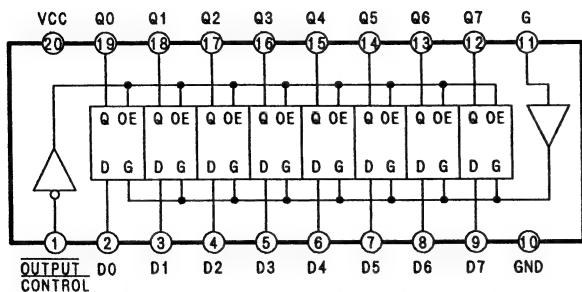


#PD27C2001
(MEMORY IC)

(BLOCK DIAGRAM)

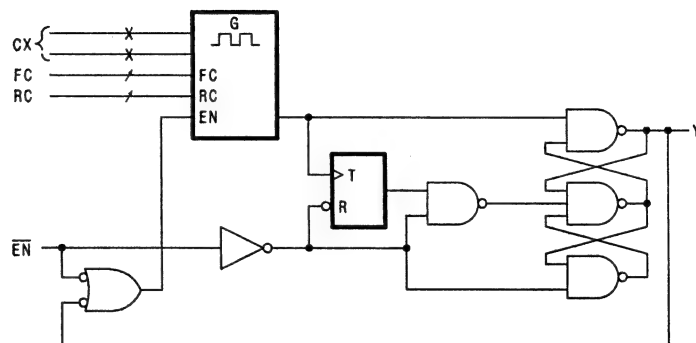
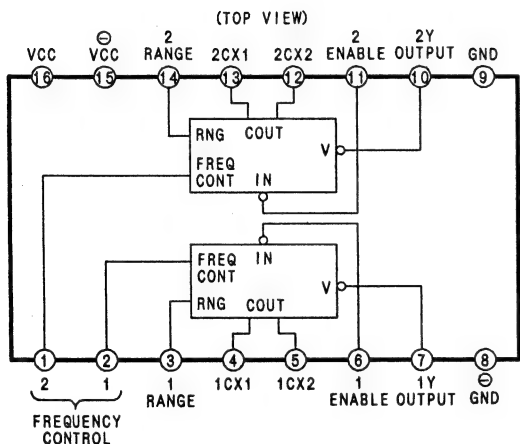


74573
(OCTAL 3 STATE D-LATCHES)

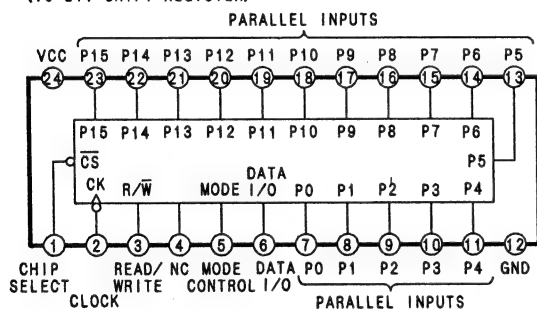


INPUT		FUNCTION
OUTPUT CONTROL	LATCH ENABLE	
L	L	LATCH (HOLD)
L	H	Q=D
H	X	HIGH-Z

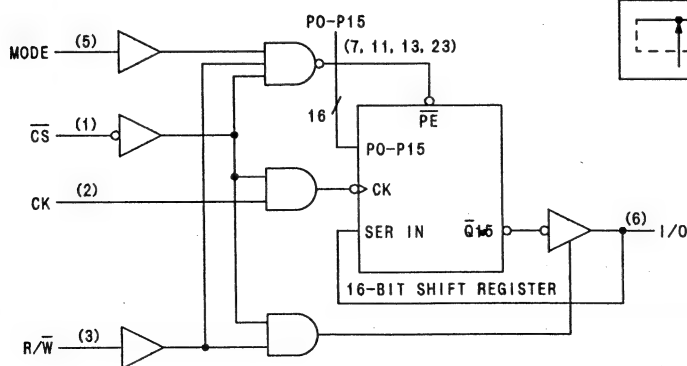
74629
(DUAL VCO)



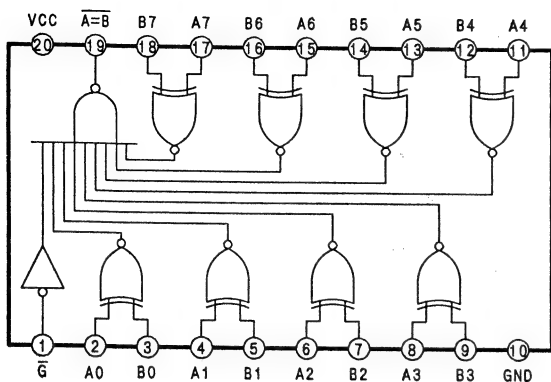
74674
(16 BIT SHIFT REGISTER)



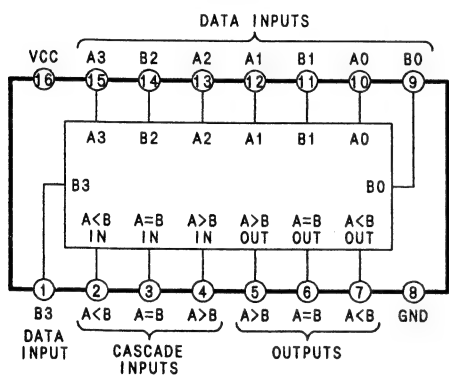
INPUTS				I/O PORT	OPERATION
CS	R/W	MODE	CLOCK		
H	X	X	X	Z	DO NOTHING
L	L	X	I	Z	SHIFT AND WRITE (SERIAL LOAD)
L	H	L	I	Q14N	SHIFT AND READ
L	H	H	I	P15	PARALLEL LOAD



74688
(8 BIT EQUAL-TO COMPARATOR)



7485
(4 BIT MAGNITUDE COMPARATOR)

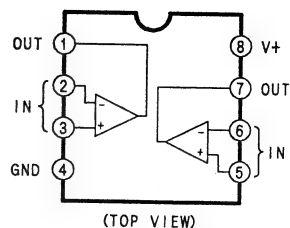
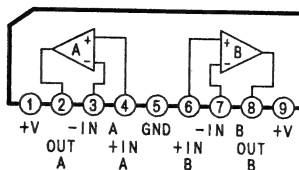


FUNCTION TABLES

COMPARING INPUTS				CASCADING INPUTS			OUTPUTS		
A3, B3	A2, B2	A1, B1	A0, B0	A>B	A<B	A=B	A>B	A<B	A=B
A3>B3	X	X	X	X	X	X	H	L	L
A3<B3	X	X	X	X	X	X	L	H	L
A3=B3	A2>B2	X	X	X	X	X	H	L	L
A3=B3	A2<B2	X	X	X	X	X	L	H	L
A3=B3	A2=B2	A1>B1	X	X	X	X	H	L	L
A3=B3	A2=B2	A1<B1	X	X	X	X	L	H	L
A3=B3	A2=B2	A1=B1	A0>B0	X	X	X	H	L	L
A3=B3	A2=B2	A1=B1	A0<B0	X	X	X	L	H	L
A3=B3	A2=B2	A1=B1	A0=B0	H	L	L	H	L	L
A3=B3	A2=B2	A1=B1	A0=B0	L	H	L	L	H	L

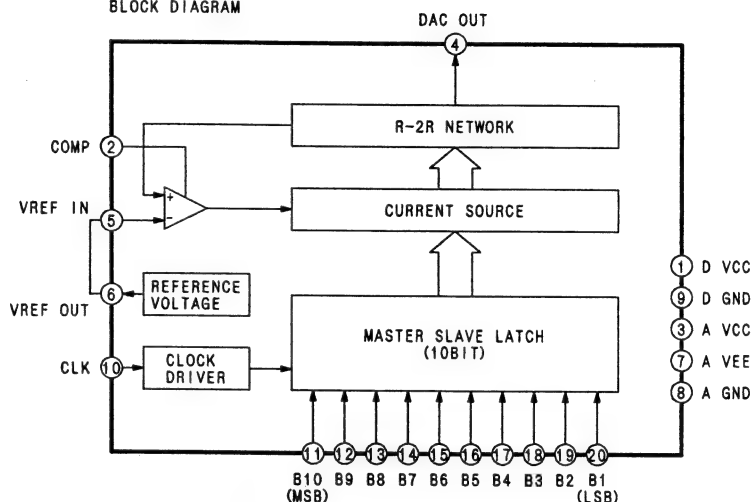
A3=B3	A2=B2	A1=B1	A0=B0	X	X	H	L	L	H
A3=B3	A2=B2	A1=B1	A0=B0	H	H	L	L	L	L
A3=B3	A2=B2	A1=B1	A0=B0	L	L	L	H	H	L

AN6558/S
(LOW NOISE, HIGH SPEED AMP)

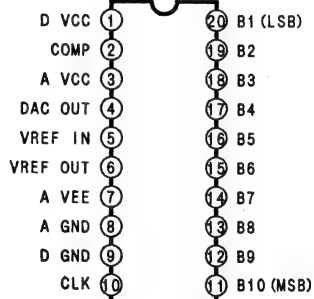


HA19505
(VIDEO 10 BIT D/A CONVERTER)

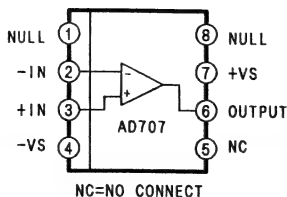
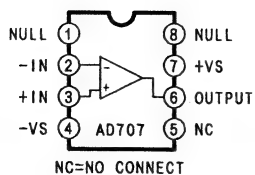
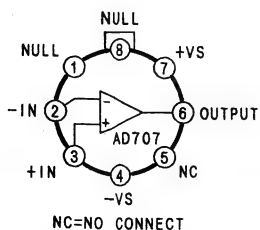
BLOCK DIAGRAM



(TOP VIEW)

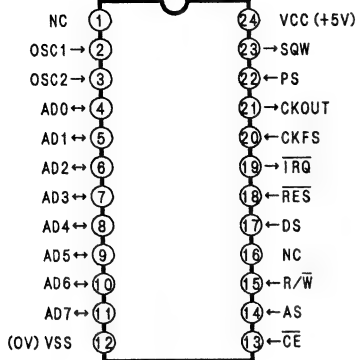


AD707KR
(SUPPLIER LOW DRIFT)

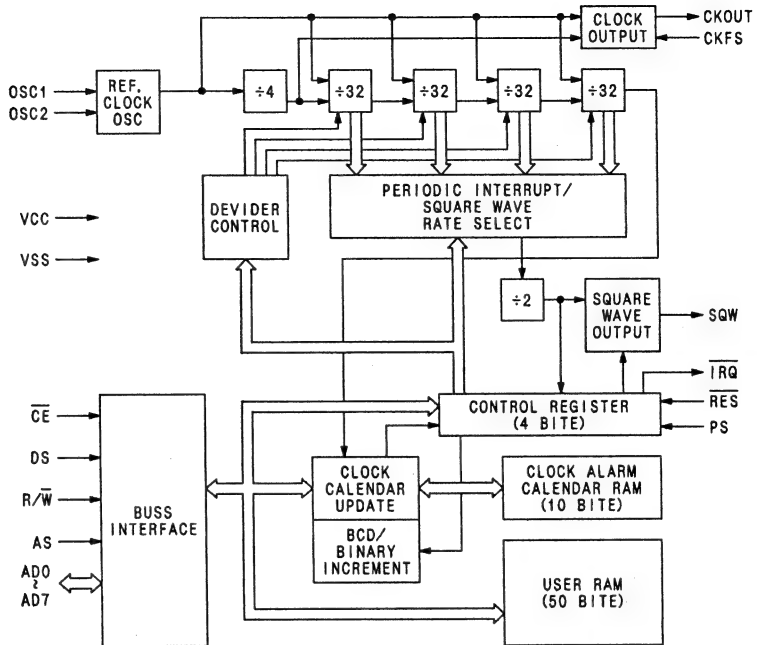


HD146818 (REAL TIME CLOCK PLUS RAM)

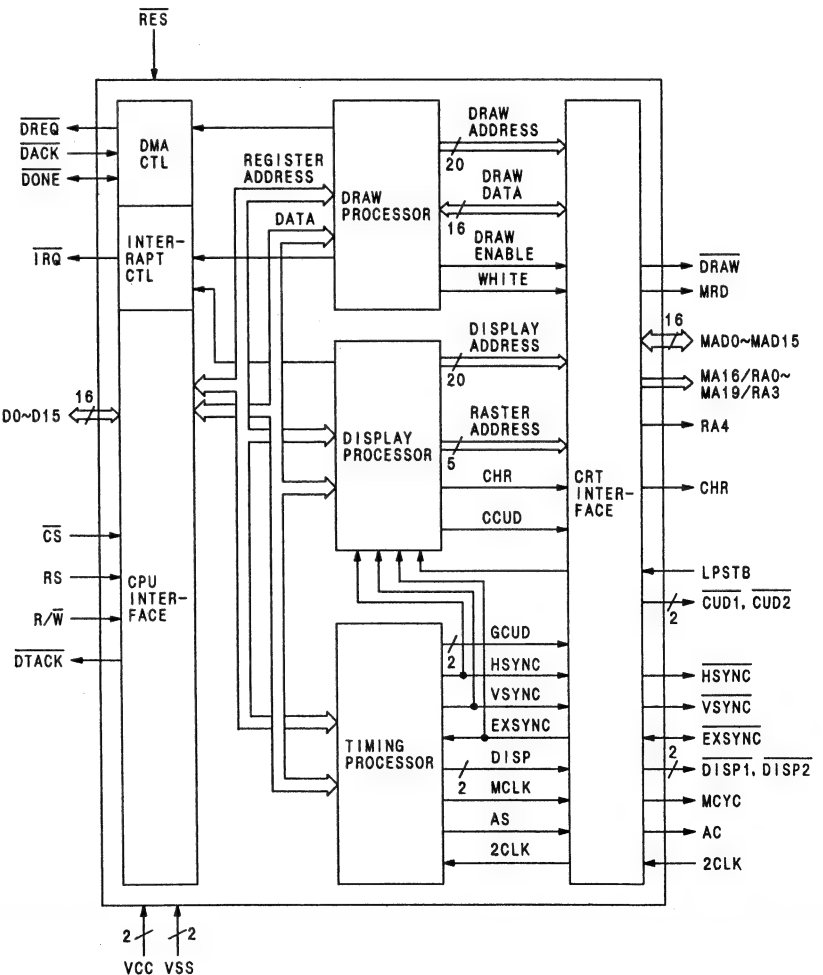
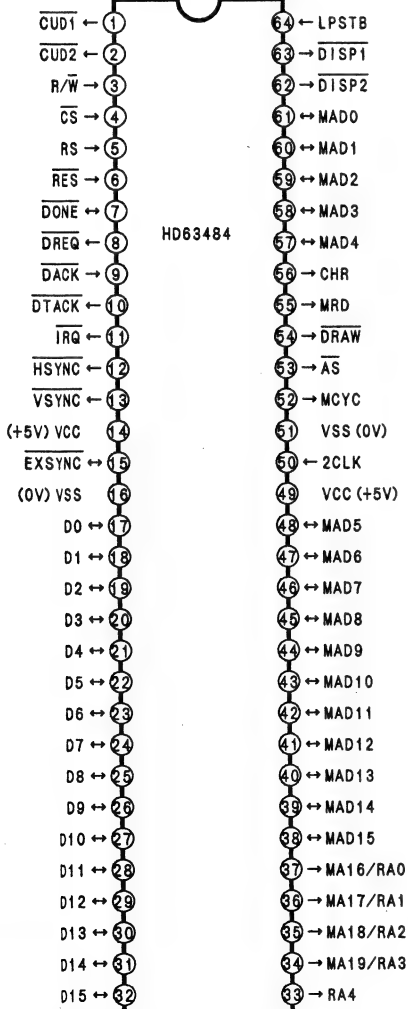
(TOP VIEW)

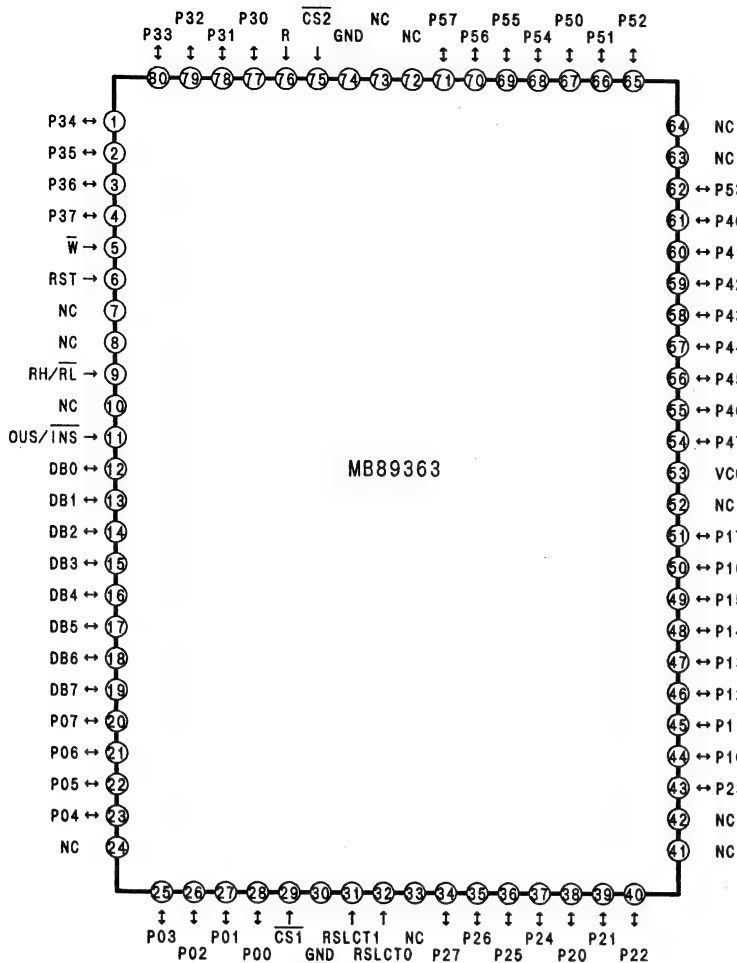


BLOCK DIAGRAM



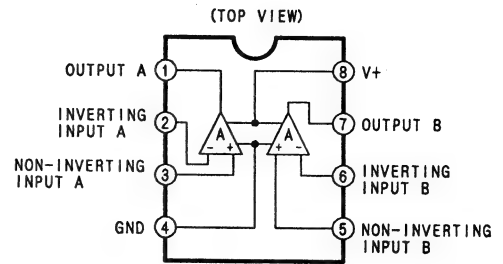
HD63484 (ADVANCED CRT CONTROLLER)





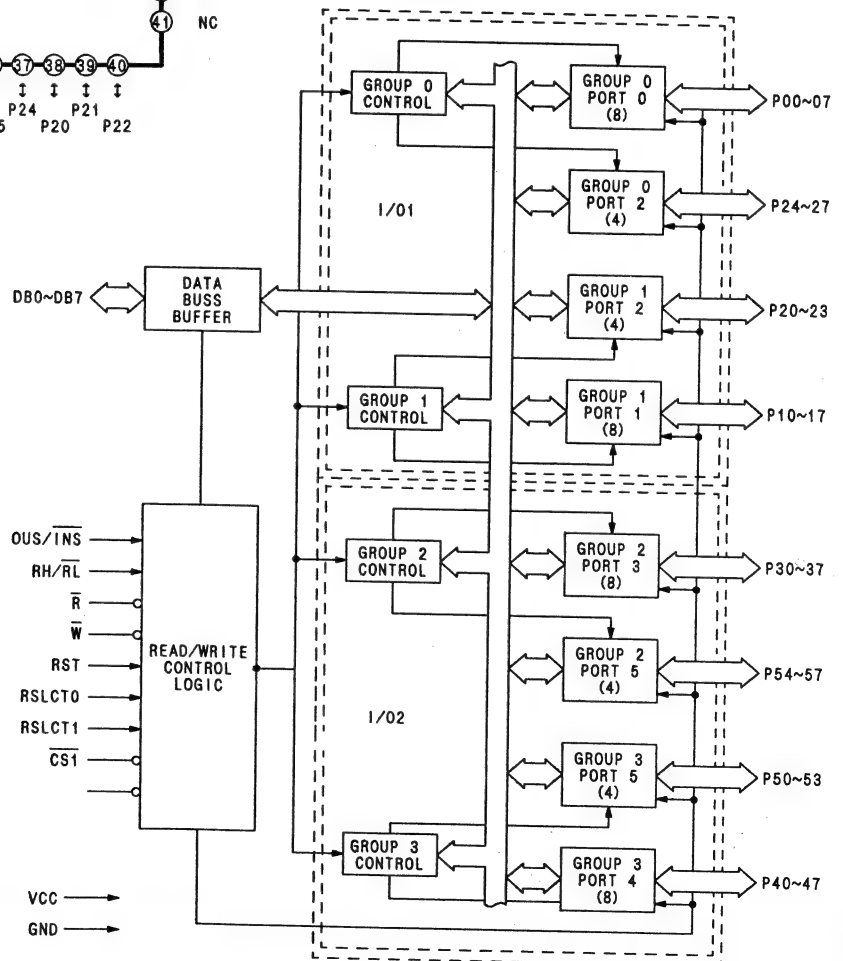
MB89363

LM2903M
(VOLTAGE COMPARATOR (DUAL))

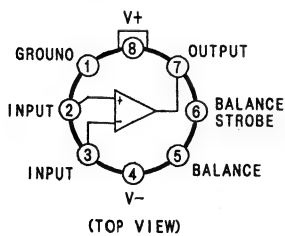


MB89363
(PROGRAMMABLE PERIPHERAL INTERFACE)
(TOP VIEW)

BLOCK DIAGRAM

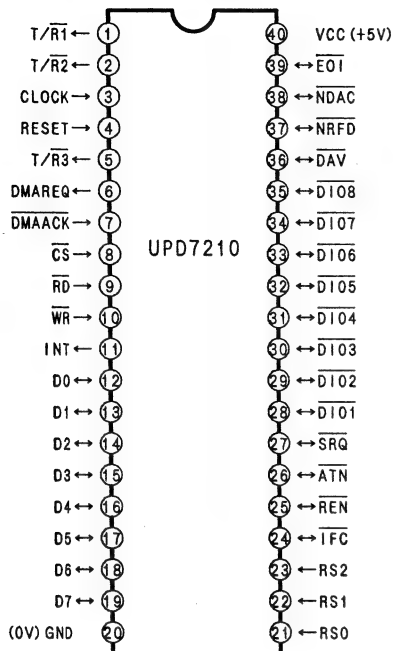


LM311M
(VOLTAGE COMPARATOR)

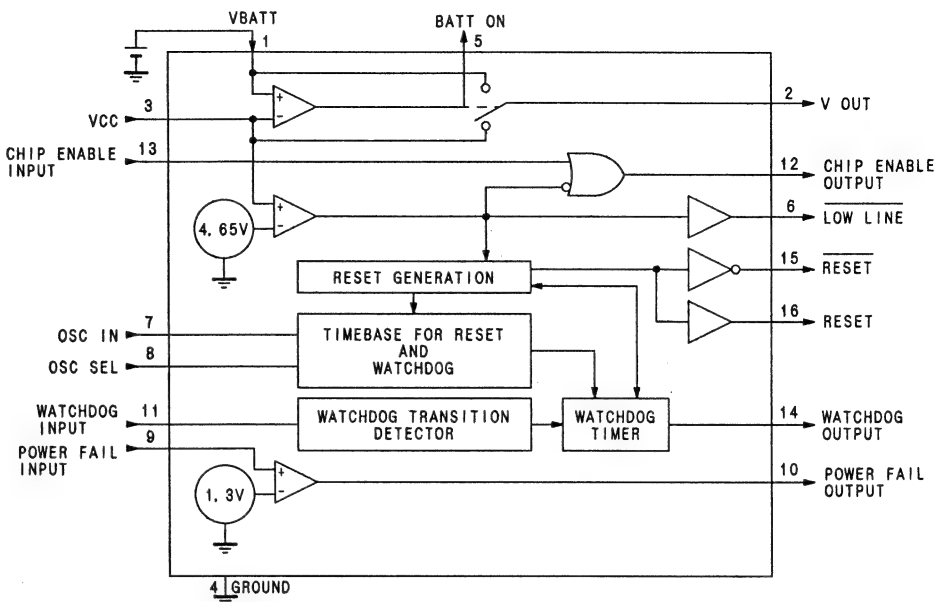


UPD7210 (GP1B INTERFACE CONTROLLER)

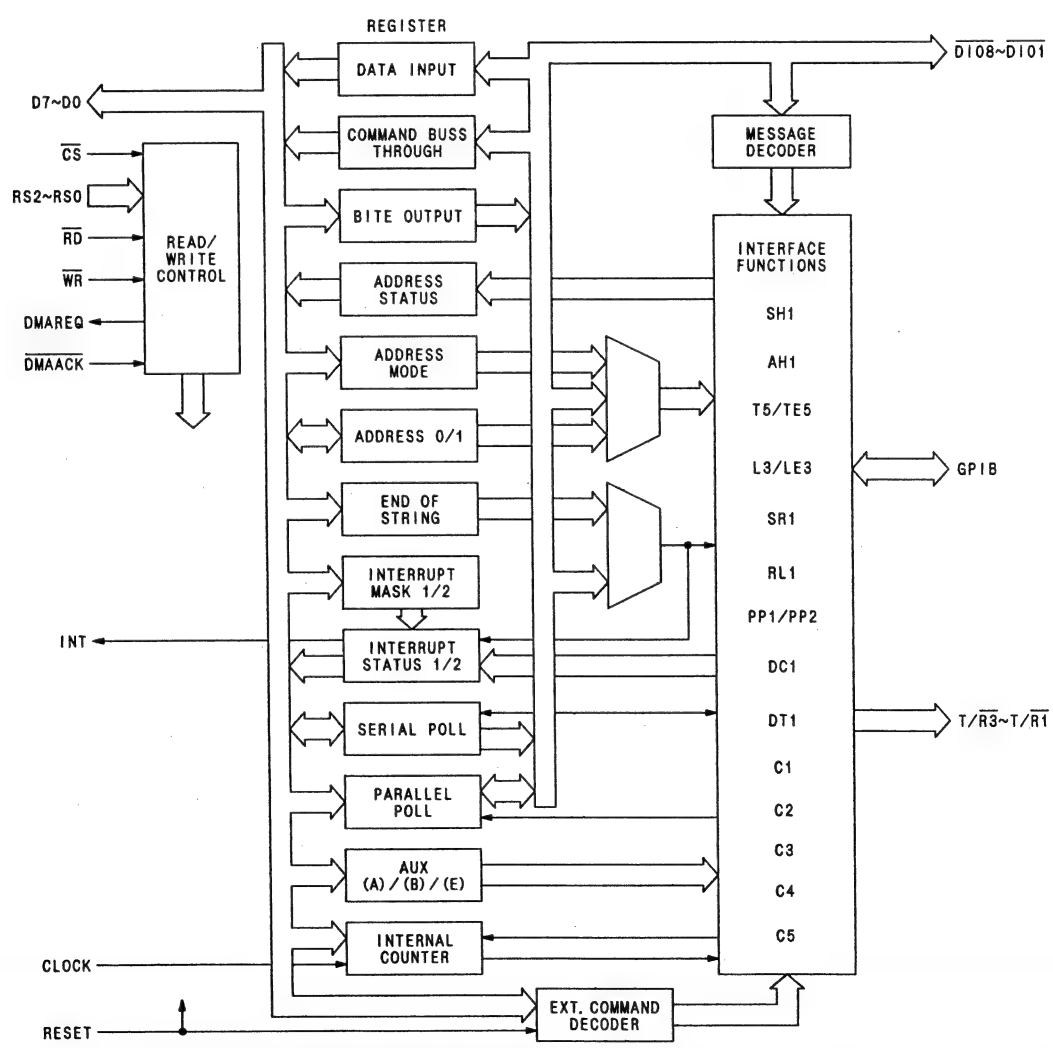
(TOP VIEW)



MAX690 (POWER WATCHDOG & CONTROL) BLOCK DIAGRAM

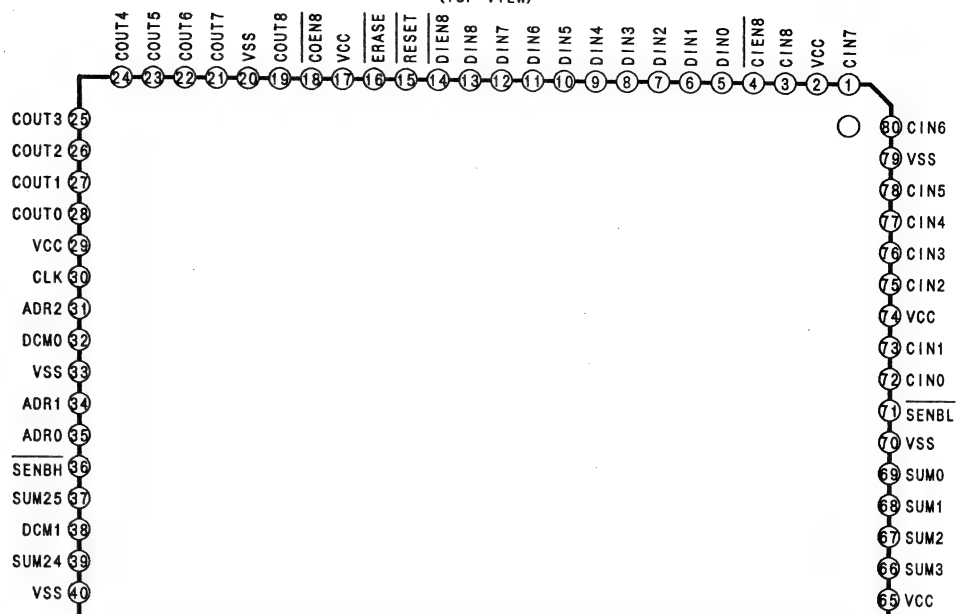


BLOCK DIAGRAM

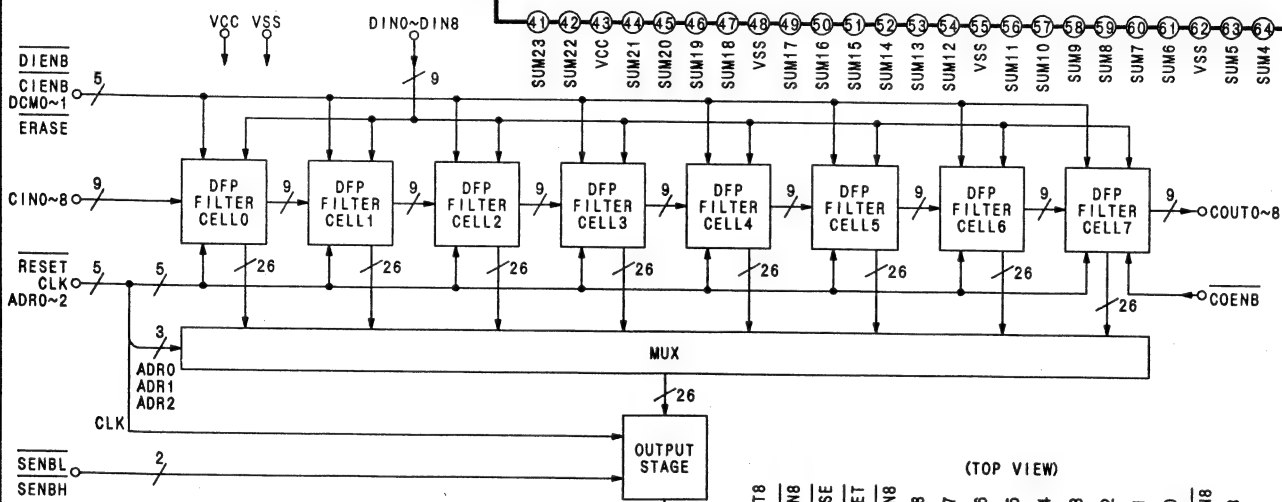


ZR33891
(DIGITAL FILTER PROCESSOR)

(TOP VIEW)

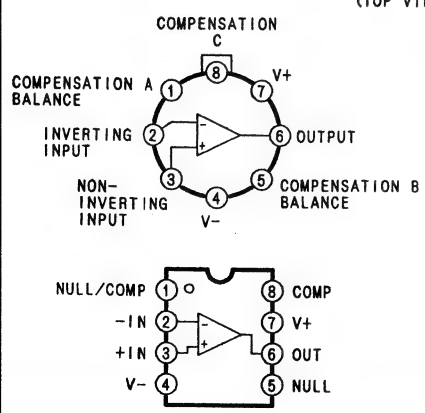


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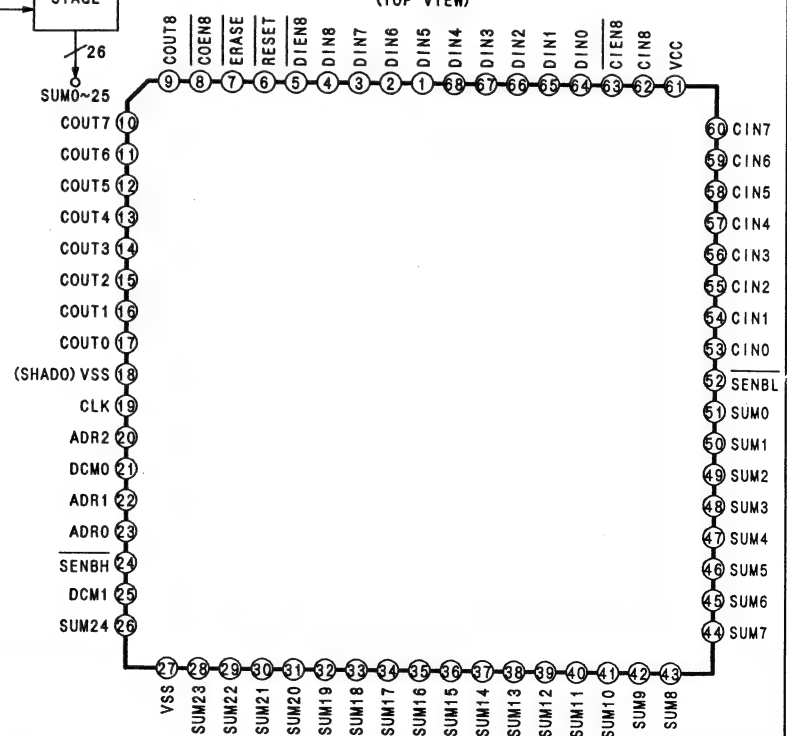


LM318N

(TOP VIEW)



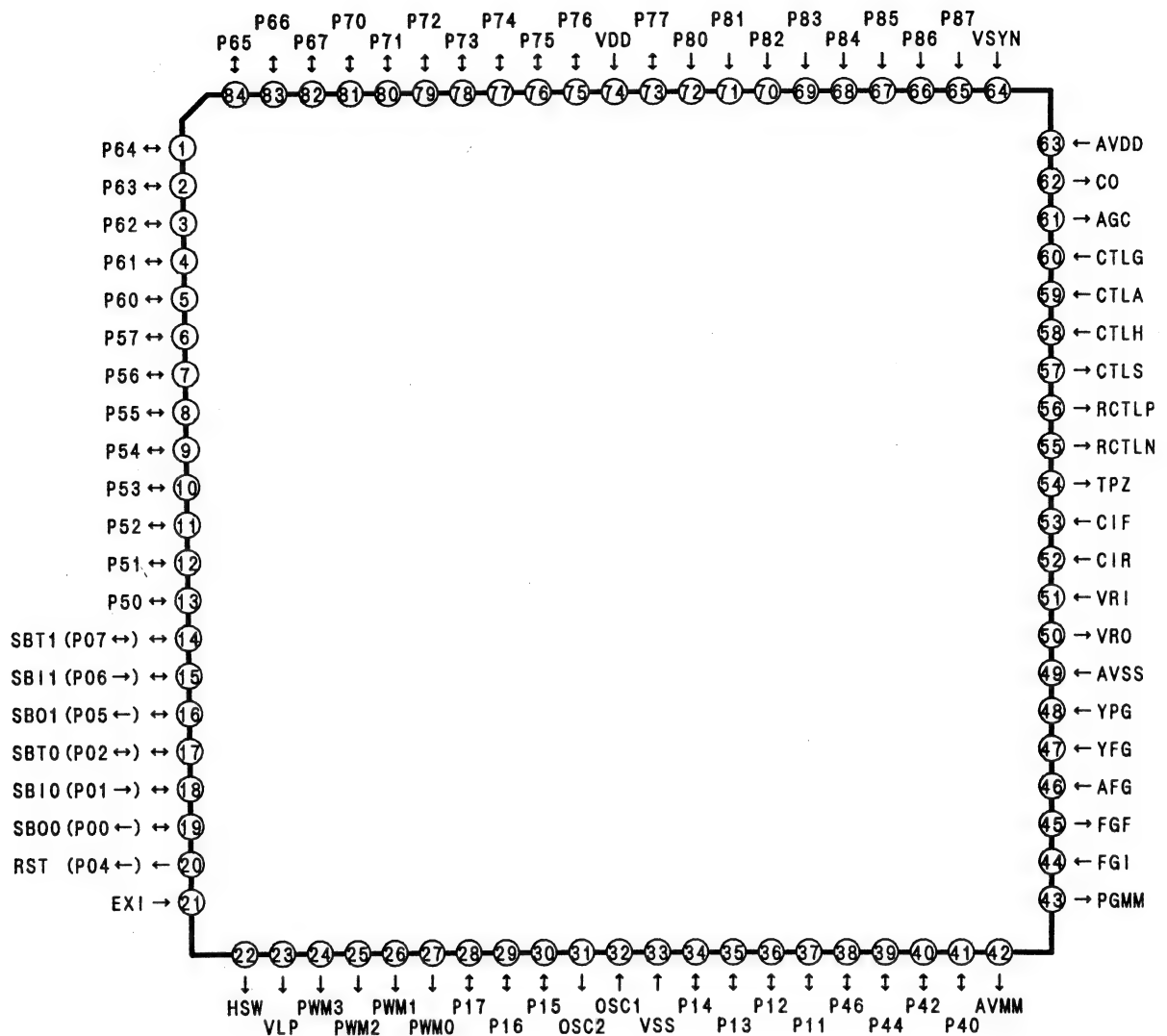
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MN67512

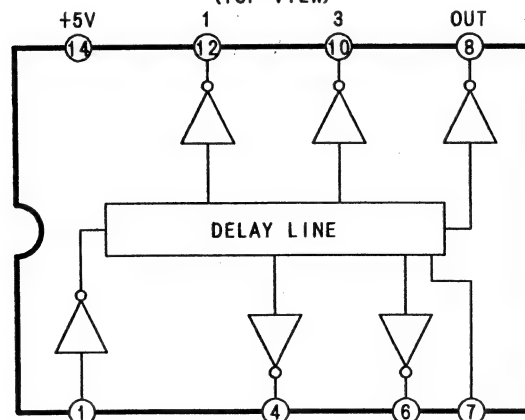
(MICROPROCESSOR FOR VTR SERVO)

(TOP VIEW)

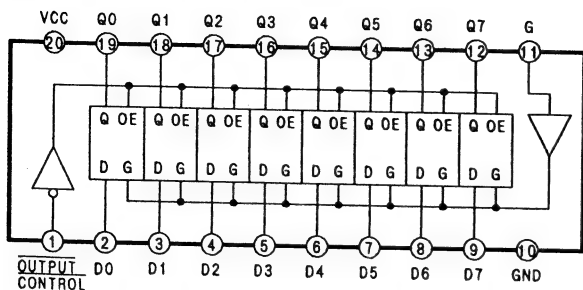


ADM50ND (DELAY IC)

(TOP VIEW)

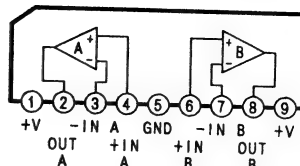


74573
(OCTAL 3 STATE D-LATCHES)

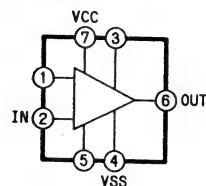


INPUT		FUNCTION
OUTPUT CONTROL	LATCH ENABLE	
L	L	LATCH (HOLD)
L	H	Q=D
H	X	HIGH-Z

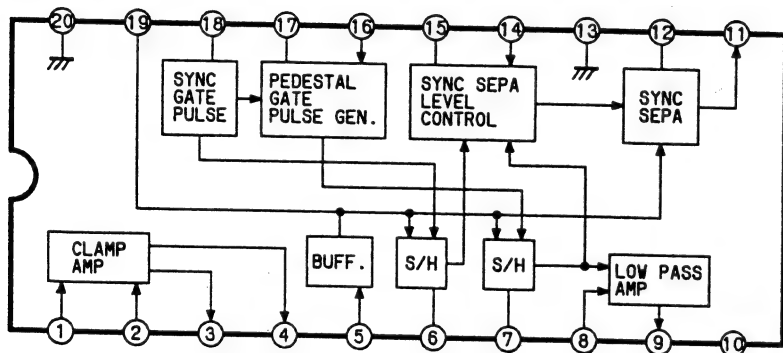
AN6558/S
(LOW NOISE, HIGH SPEED AMP)



BA301

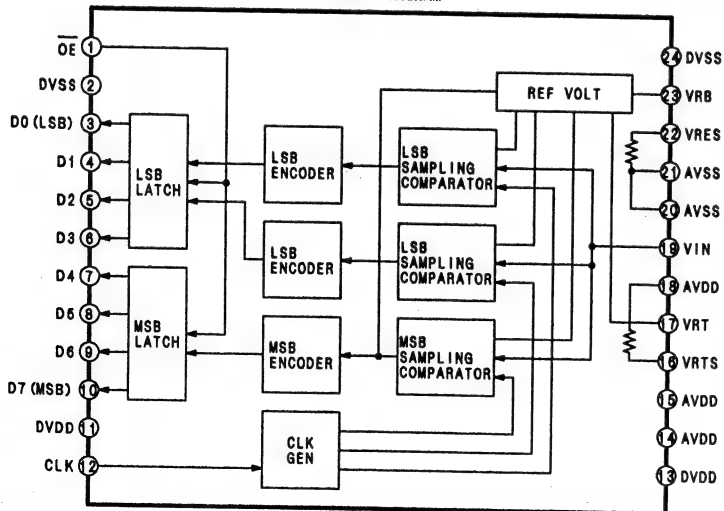


AN91A12S
(SYNC SEPARATOR)

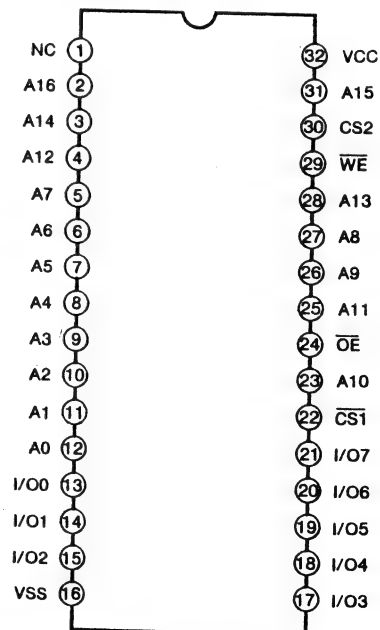


CXD1175M
(8 bit VIDEO A/D)

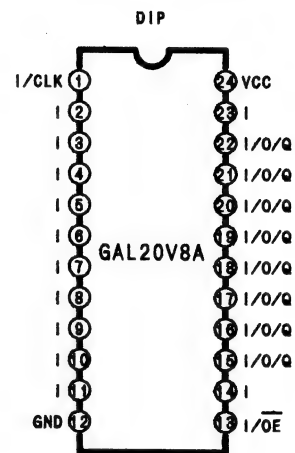
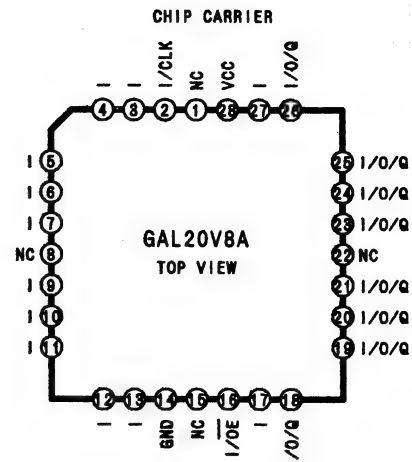
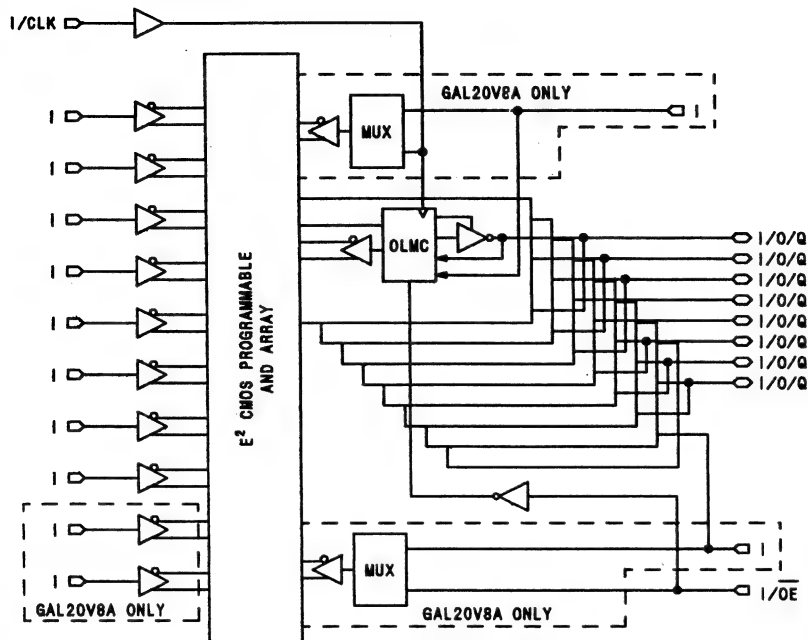
BLOCK DIAGRAM



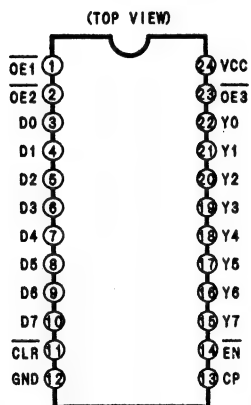
HM628128LFP7
(131.072X8BIT S-RAM)



GAL20V8A (E² CMOS PROGRAMMABLE AND ARRAY (84x40))



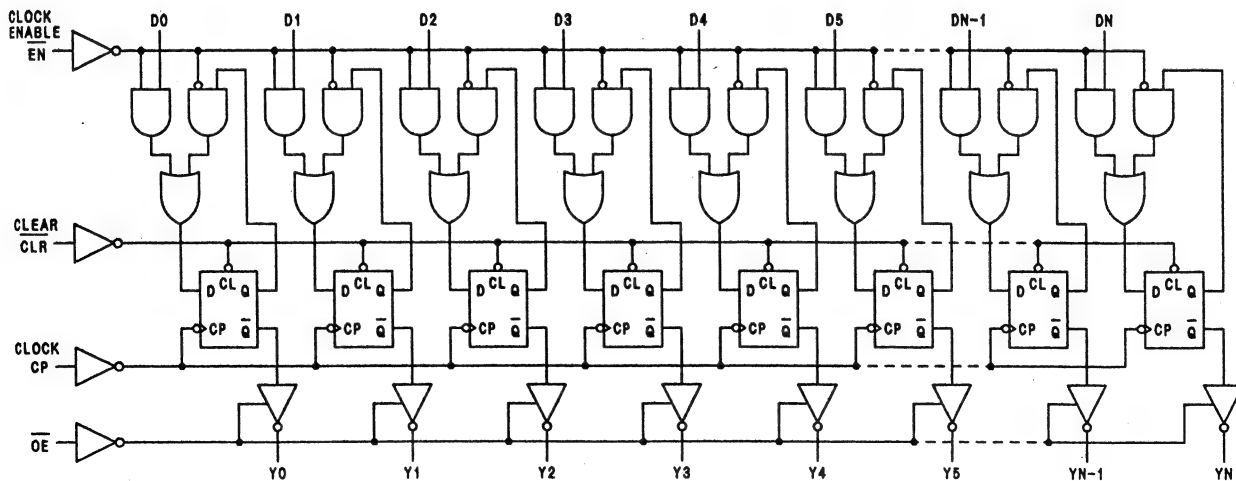
IDTFCT825AS0 (LATCH)



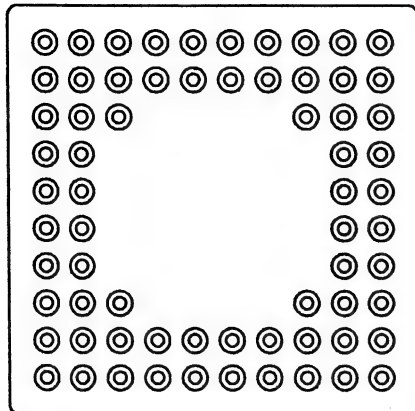
TRUTH TABLE

INPUTS					INTERNAL OUTPUTS		FUNCTION
OE	CLR	EN	D1	CP	Q1	Y1	
H	X	L	L	1	L	Z	HIGH Z
H	X	L	H	1	H	Z	
H	L	X	X	X	L	Z	CLEAR
L	L	X	X	X	L	L	
H	H	H	X	X	NC	Z	HOLD
L	H	H	X	X	NC	NC	
H	H	L	L	1	L	Z	LOAD
H	H	L	H	1	H	Z	
L	H	L	L	1	L	L	
L	H	L	H	1	H	H	

NOTE:
1. H=HIGH, L=LOW, X=DON'T CARE, NC=NO CHANGE, 1=LOW-TO-HIGH TRANSITION, Z=HIGH IMPEDANCE



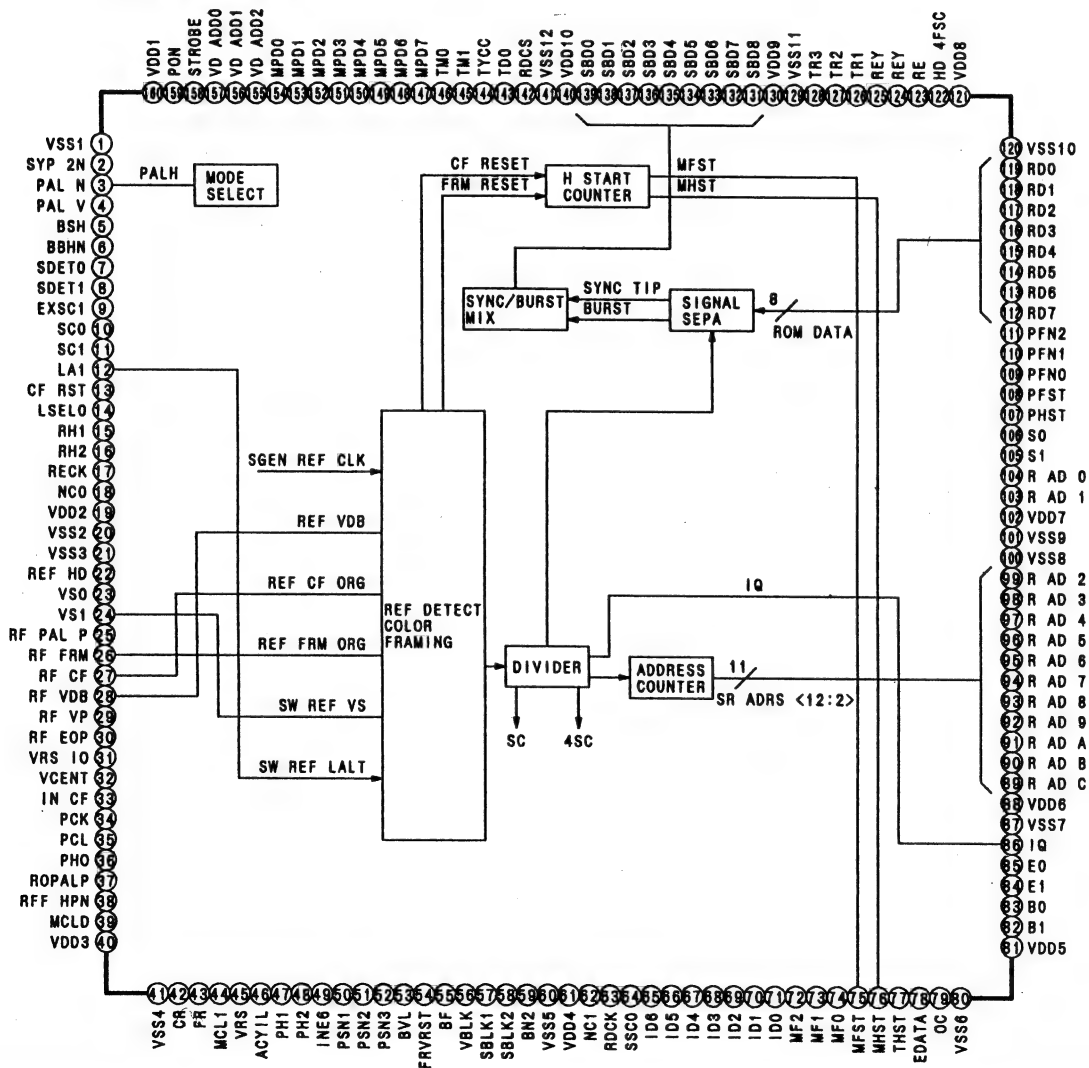
HD68000Y10
(16 BIT CPU)



PGA 68PIN

PIN ON.	SIGNAL NAME	I/O	PIN ON.	SIGNAL NAME	I/O	PIN ON.	SIGNAL NAME	I/O	PIN ON.	SIGNAL NAME	I/O
1	—	—	18	A9	0	35	D1	I/O	52	A12	0
2	DTACK	I	19	—	—	36	AS	0	53	A15	0
3	BGACK	I	20	A14	0	37	LDS	0	54	A18	0
4	BR	I	21	A16	0	38	BG	0	55	VCC	—
5	CLK	—	22	A17	0	39	VCC	—	56	VSS	—
6	HALT	I/O	23	A19	0	40	VSS	—	57	A23	0
7	VMA	0	24	A20	0	41	RES	I/O	58	D14	I/O
8	E	0	25	A21	0	42	VPA	I	59	D11	I/O
9	BERR	I	26	A22	0	43	IPL2	I	60	D9	I/O
10	—	—	27	D15	I/O	44	IPL0	I	61	D6	I/O
11	FC2	0	28	D12	I/O	45	FC1	0	62	D3	I/O
12	FC0	0	29	D10	I/O	46	—	—	63	D0	I/O
13	A1	0	30	D8	I/O	47	A2	0	64	UDS	0
14	A8	0	31	D7	I/O	48	A5	0	65	R/W	0
15	A4	0	32	D5	I/O	49	A8	0	66	IPL1	I
16	A6	0	33	D4	I/O	50	A10	0	67	A13	0
17	A7	0	34	D2	I/O	51	A11	0	68	D13	I/O

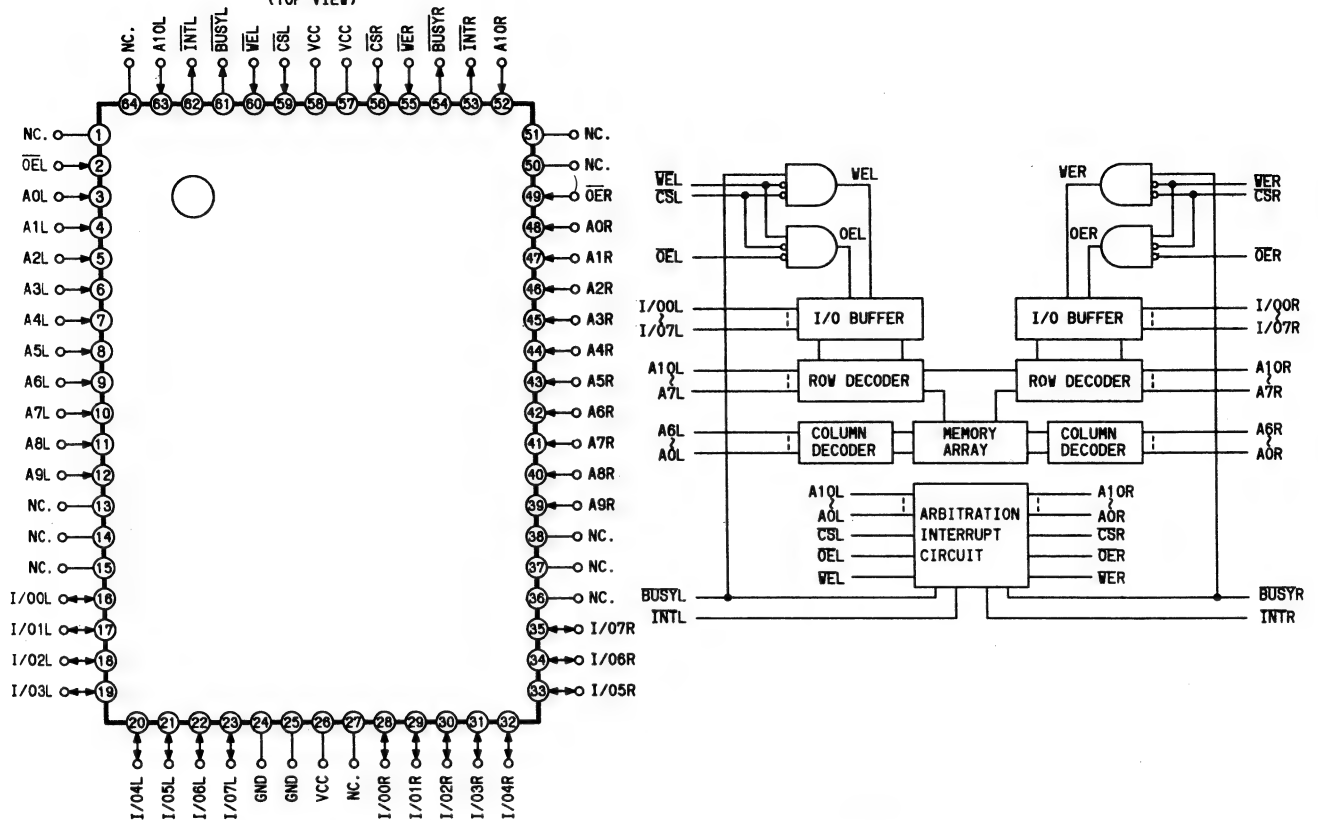
L7A0543
(SYS SYNC GENERATOR)



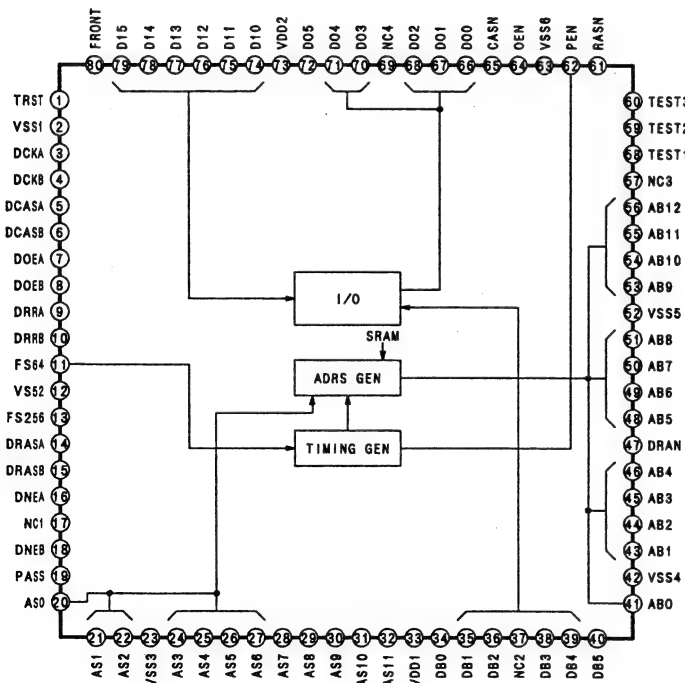
MB8421-90LPF

(16K BIT DUAL PORT STATIC RAM)

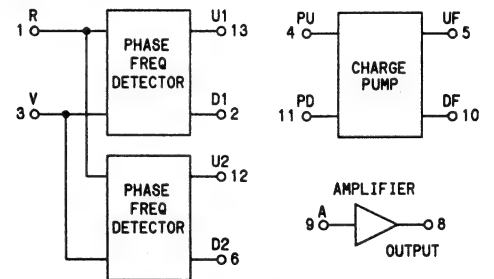
(TOP VIEW)



MB621926 (DELAY FOR DIGITAL AUDIO)



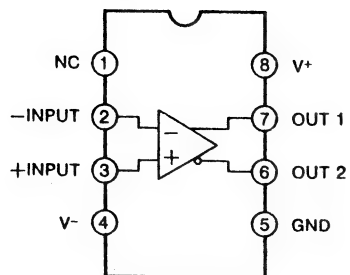
MC4044



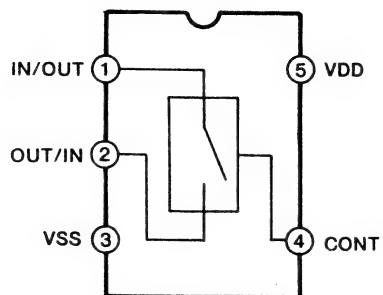
TRUTH TABLE

INPUT STATE	INPUT R	INPUT V	OUTPUT U1	OUTPUT D1	OUTPUT U2	OUTPUT D2
1	0	0	x	x	1	1
2	1	0	x	x	0	1
3	1	1	x	x	1	0
4	1	0	x	x	0	1
5	0	0	x	x	1	1
6	1	0	x	x	0	1
7	0	0	x	x	1	1
8	1	0	x	x	0	1
9	0	0	0	1	1	1
10	0	1	0	1	1	1
11	0	0	1	1	1	1
12	0	1	1	1	1	1
13	0	0	1	0	1	1
14	0	1	1	0	1	1
15	0	0	1	0	1	1
16	1	0	1	0	0	1
17	0	0	1	1	1	1

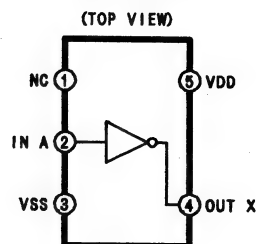
NJM360M
(OP AMP)



TC4S66F
(BILATERAL SWITCH)



TC4S69F
(INVERTER GATE)



Service Manual

Modules

- ***Block Diagrams***
- ***Printed Circuit Boards***
- ***Schematic Diagrams***

Note:

1. Do not use the part number shown on the schematic diagram or P.C.Board layout for ordering.
The correct part number for ordering is shown in the Exploded Views/Parts List section.
2. Unless otherwise specified, all resistors are in OHMS,
K=1,000 OHMS, all capacitors are in MICROFARADS (μ F), P= μ μ F.

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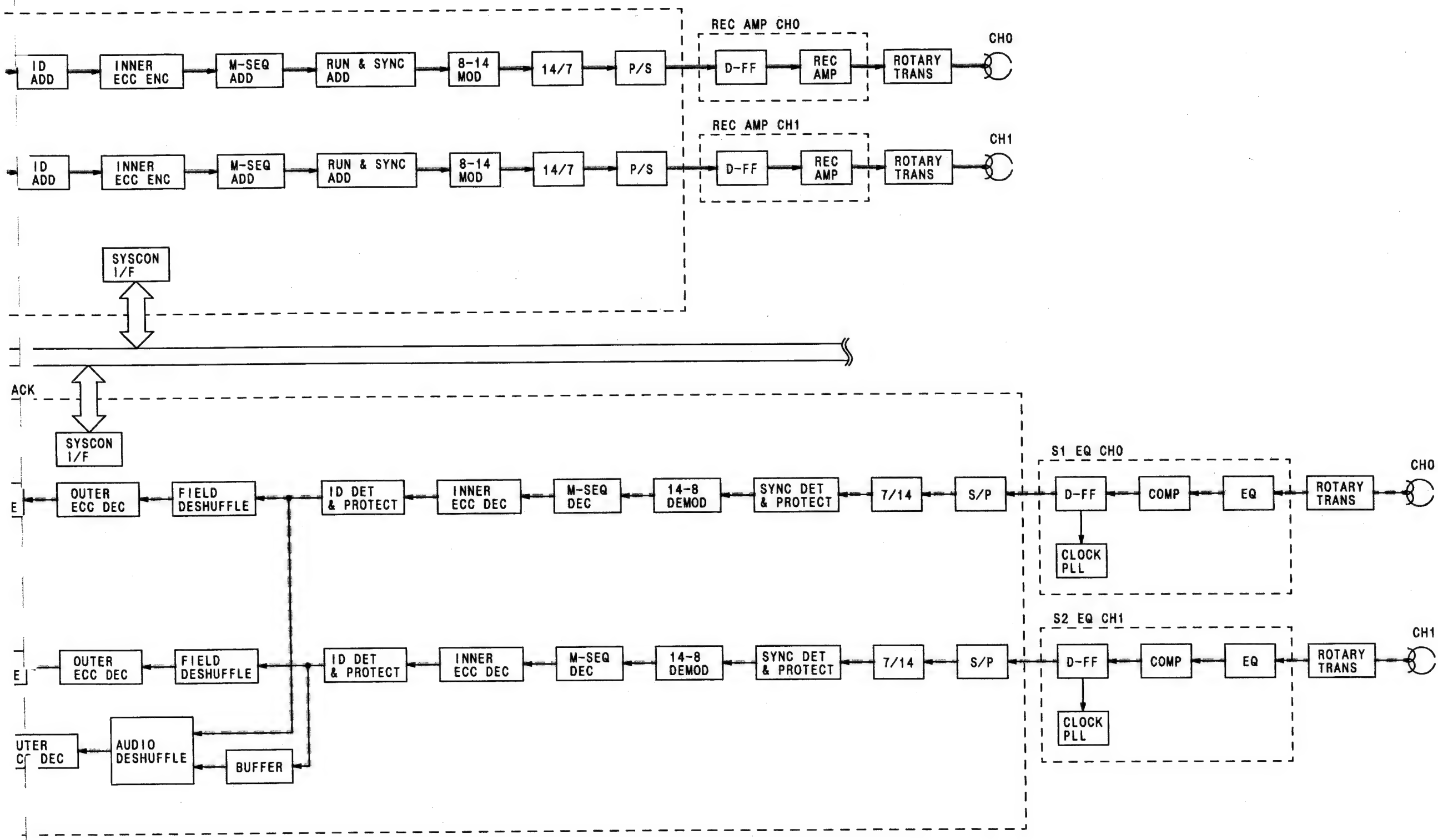
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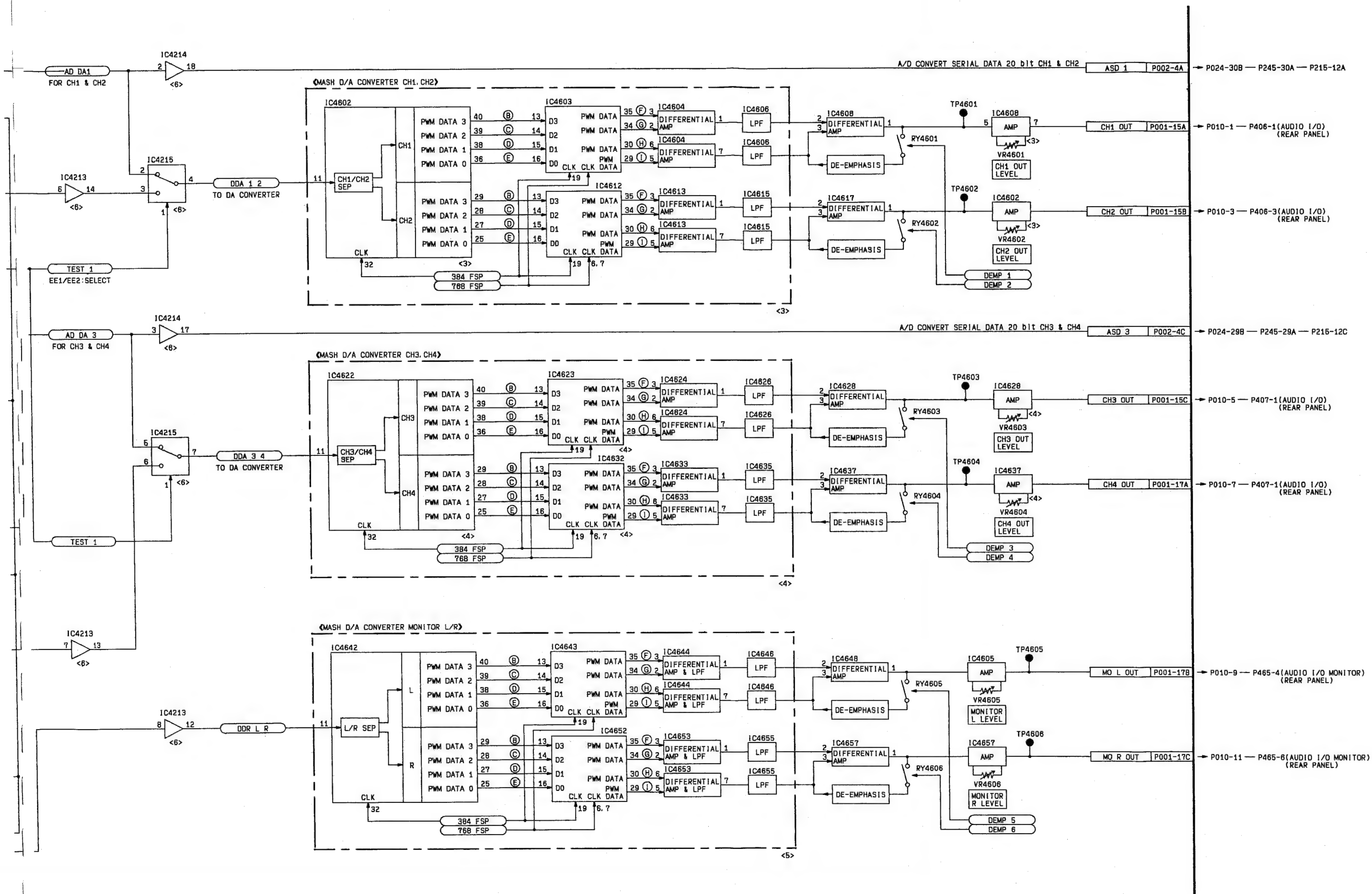
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The diagram illustrates a video recording and playback system architecture, organized into several functional blocks and processes:

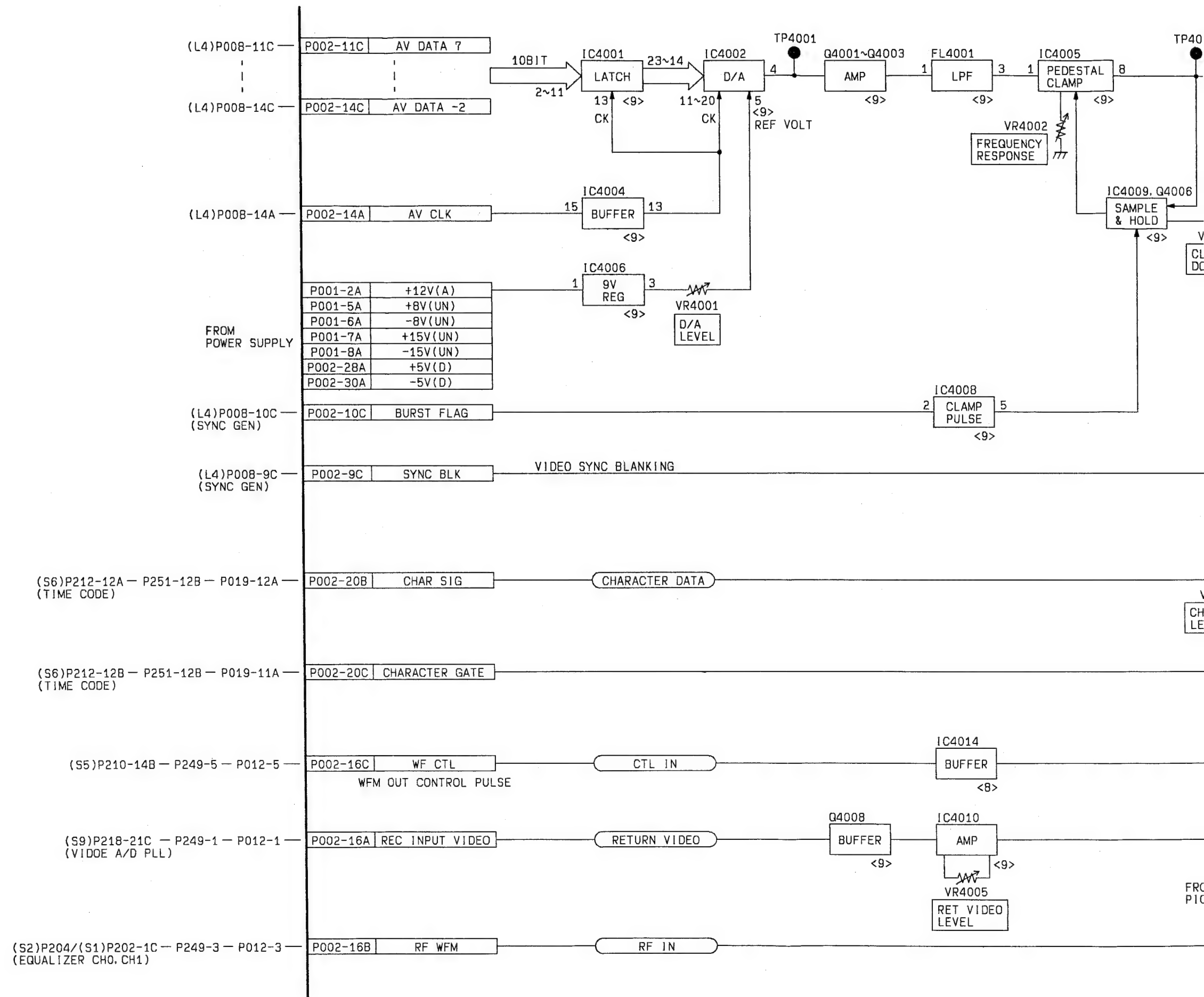
- REC DATA / PB DATA:** Indicated at the top left, likely representing recording and playback data streams.
- S9 VIDEO A/D + PLL:** This block handles the initial video input. It includes:
 - ANALOG VIDEO IN:** The primary video input source.
 - BURST SEP, PLL 4fsc, SYNC SEP, CF DET, SYNC GEN:** These components process the analog input to generate a digital signal and synchronization signals.
 - A/D:** The analog-to-digital converter.
- L2 VIDEO/AUDIO REC:** The recording stage, which includes:
 - DIGITAL VIDEO IN:** Input from the S9 block.
 - VIDEO INPUT SELECT, LINE SHUFFLE, OUTER ECC ENC, CH SEP:** These blocks process the digital video signal for recording.
 - AUDIO CLK GEN:** Provides a clock signal for the audio processing.
 - FIELD SHUFFLE, DATA MIX, ID ADD, INNER ECC ENC:** These blocks handle the audio signal, including field shuffling, mixing, adding identification, and inner error correction encoding.
 - CH SEP:** Channel separator for the audio.
 - SYSCON I/F:** System control interface.
- S8 AUDIO PROCESS:** The audio processing stage, which includes:
 - JOG/VAR CONTROL, CROSS FADE, 3V DELAY, TCG:** These blocks manage audio control and timing.
 - DIGITAL AUDIO IN, DIGITAL AUDIO I/F, AUDIO INPUT SELECT:** These blocks handle digital audio input and selection.
 - ANALOG AUDIO, A/D, D/A:** These blocks handle analog audio input and output.
 - SYSCON I/F:** System control interface.
- L4 VIDEO PROCESS:** The video processing stage, which includes:
 - SYNC GEN, SYNC BURST ADD, PROC AMP, INTERPOLATE, Y/C, VIDEO ERROR CONCEAL:** These blocks process the video signal, including synchronization, amplification, interpolation, color processing, and error concealment.
 - CPU:** The central processing unit, which interacts with the system control interface.
- L3 VIDEO/AUDIO PLAYBACK:** The playback stage, which includes:
 - FIELD DESHUFFLE, OUTER ECC DEC, LINE DESHUFFLE, CH MIX, INTERPOLATE AUDIO CONCEAL, OUTER ECC DEC, AUDIO DESHUFFLE:** These blocks handle the playback of the recorded video and audio, including deshuffling, error correction, mixing, and interpolation.
 - SYSCON I/F:** System control interface.
- L1 VIDEO D/A AUDIO A/D, D/A:** The final output stage, which includes:
 - ANALOG VIDEO OUT, DIGITAL VIDEO OUT:** The final video outputs.
 - ANALOG AUDIO OUT, DIGITAL AUDIO OUT:** The final audio outputs.
 - A/D, D/A:** Analog-to-digital and digital-to-analog converters for the audio.
 - SYSCON I/F:** System control interface.

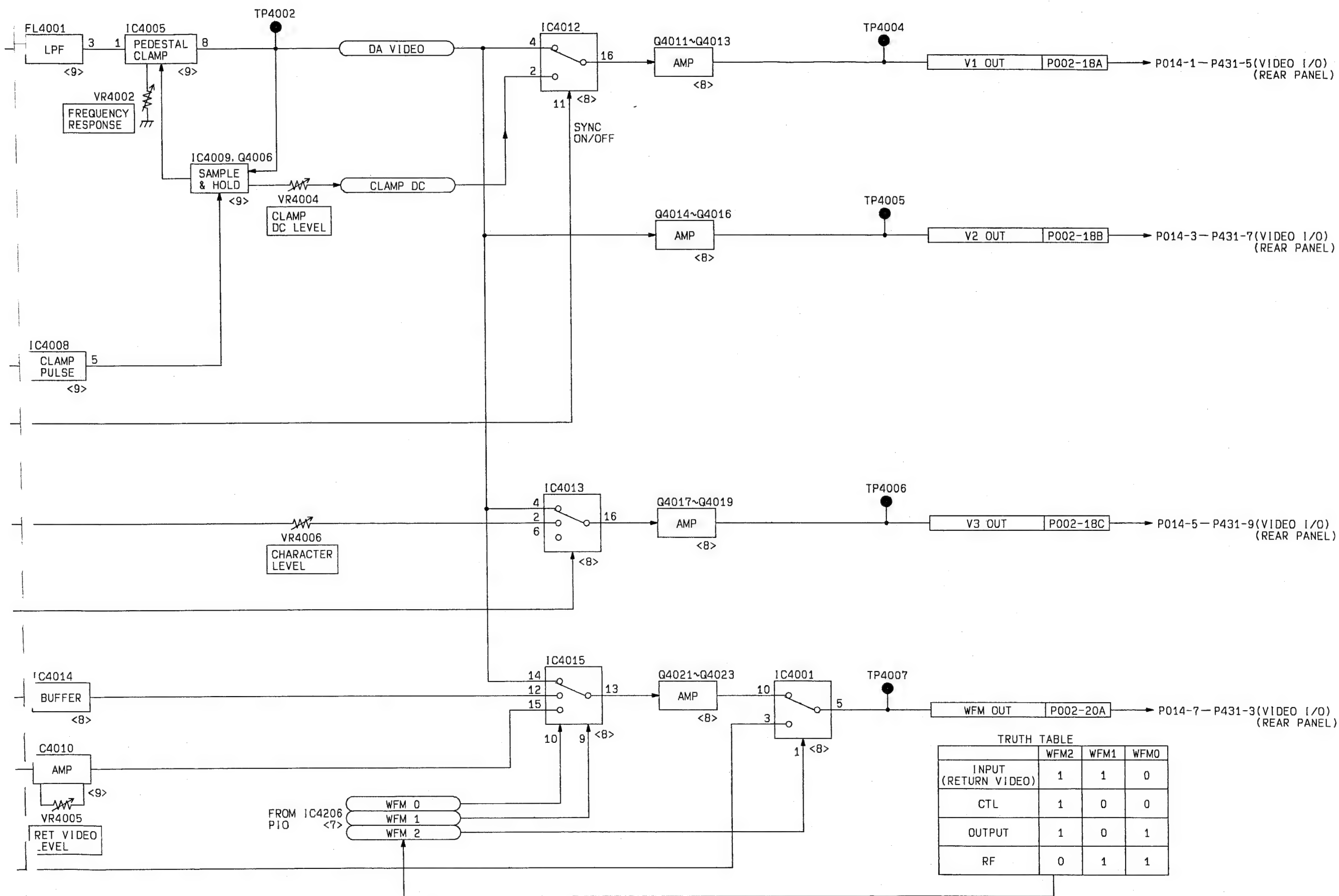


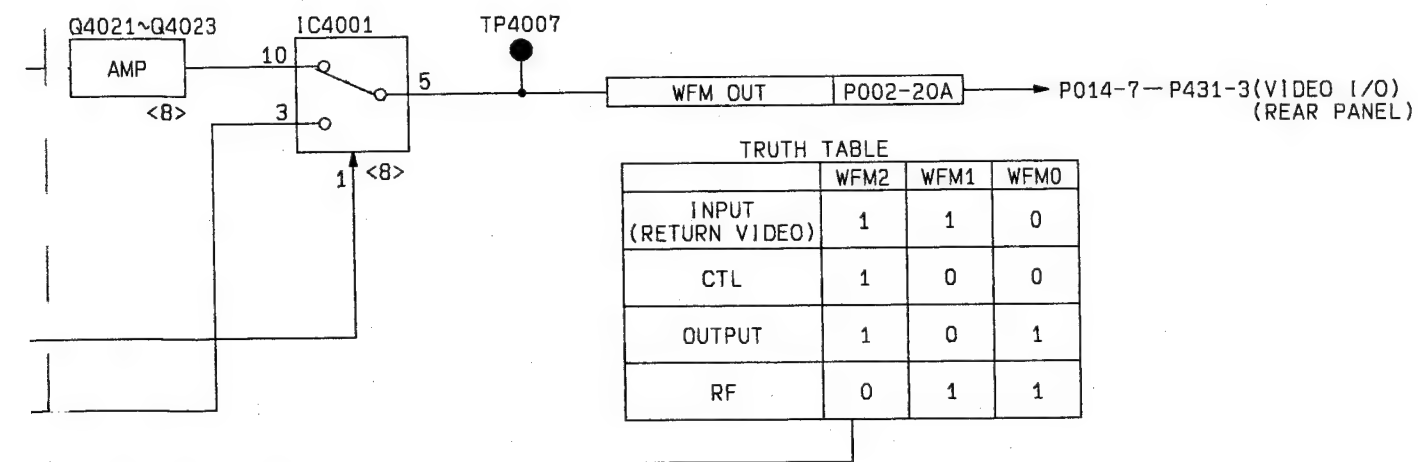
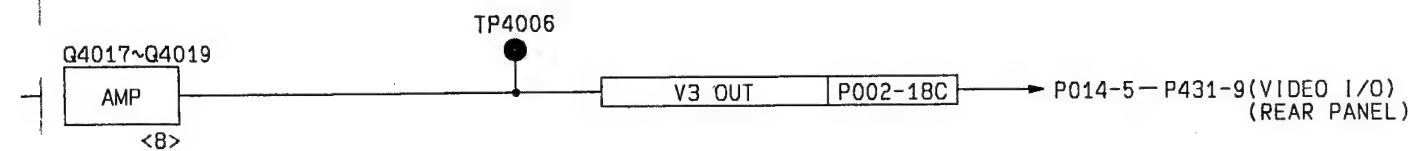
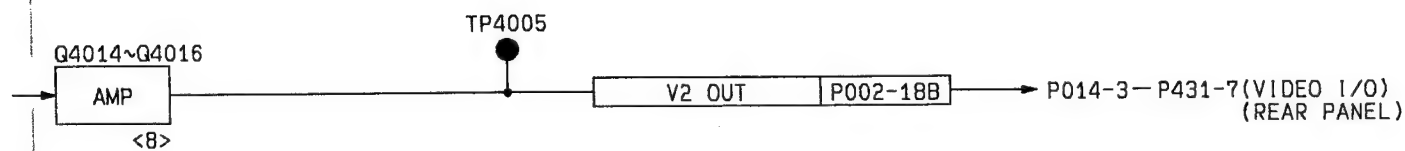
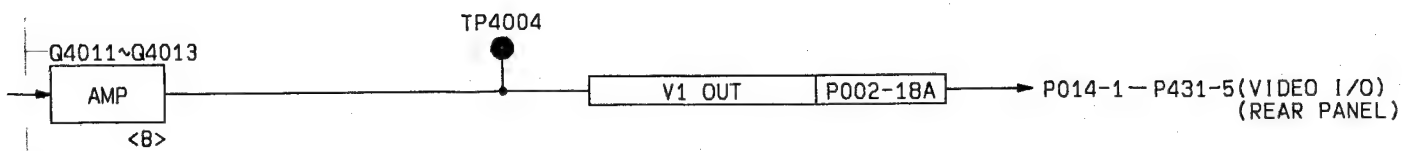




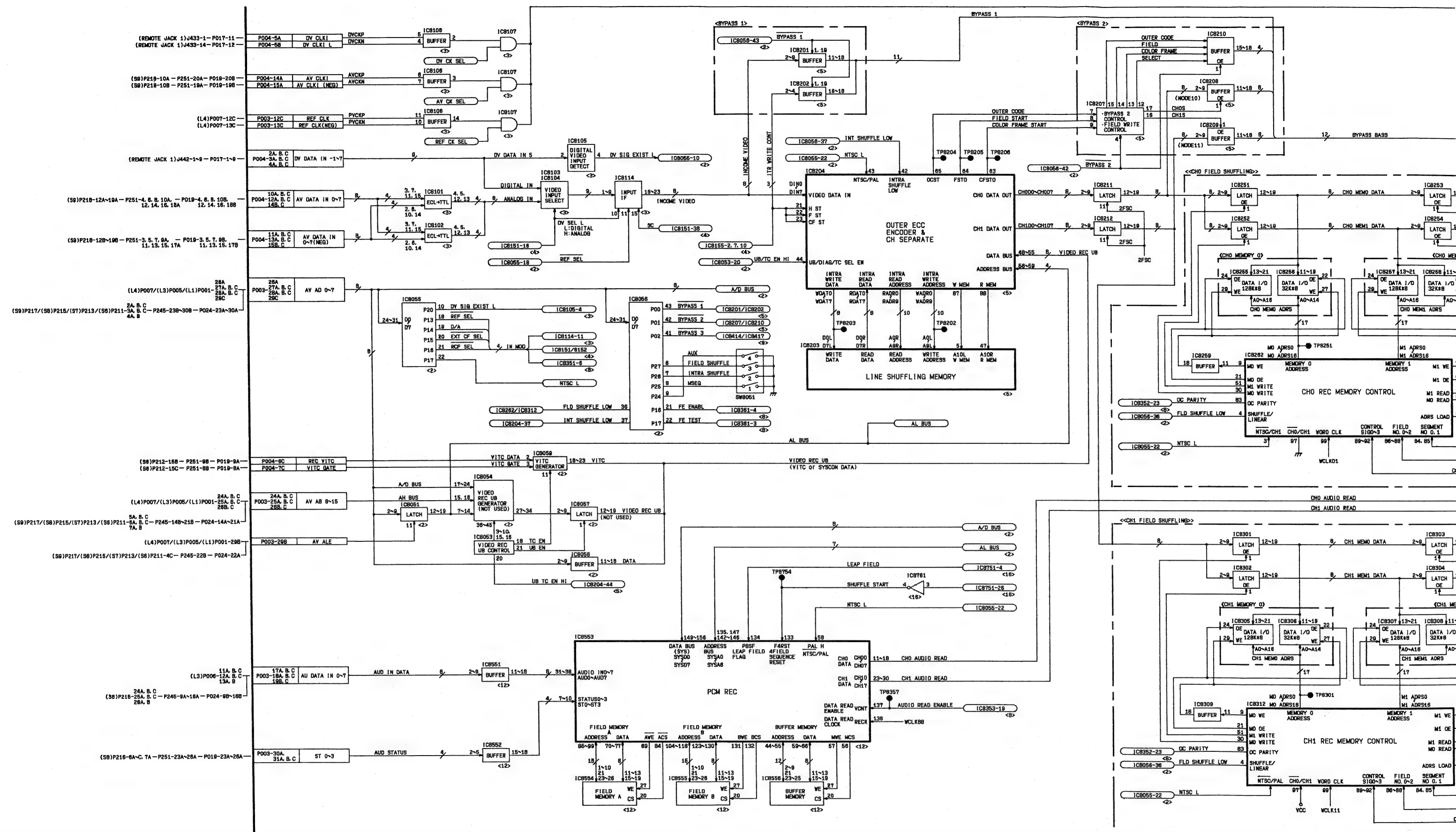
L1 AUDIO A/D, D/A, VIDEO D/A BLOCK DIAGRAM (VIDEO D/A SECTION)



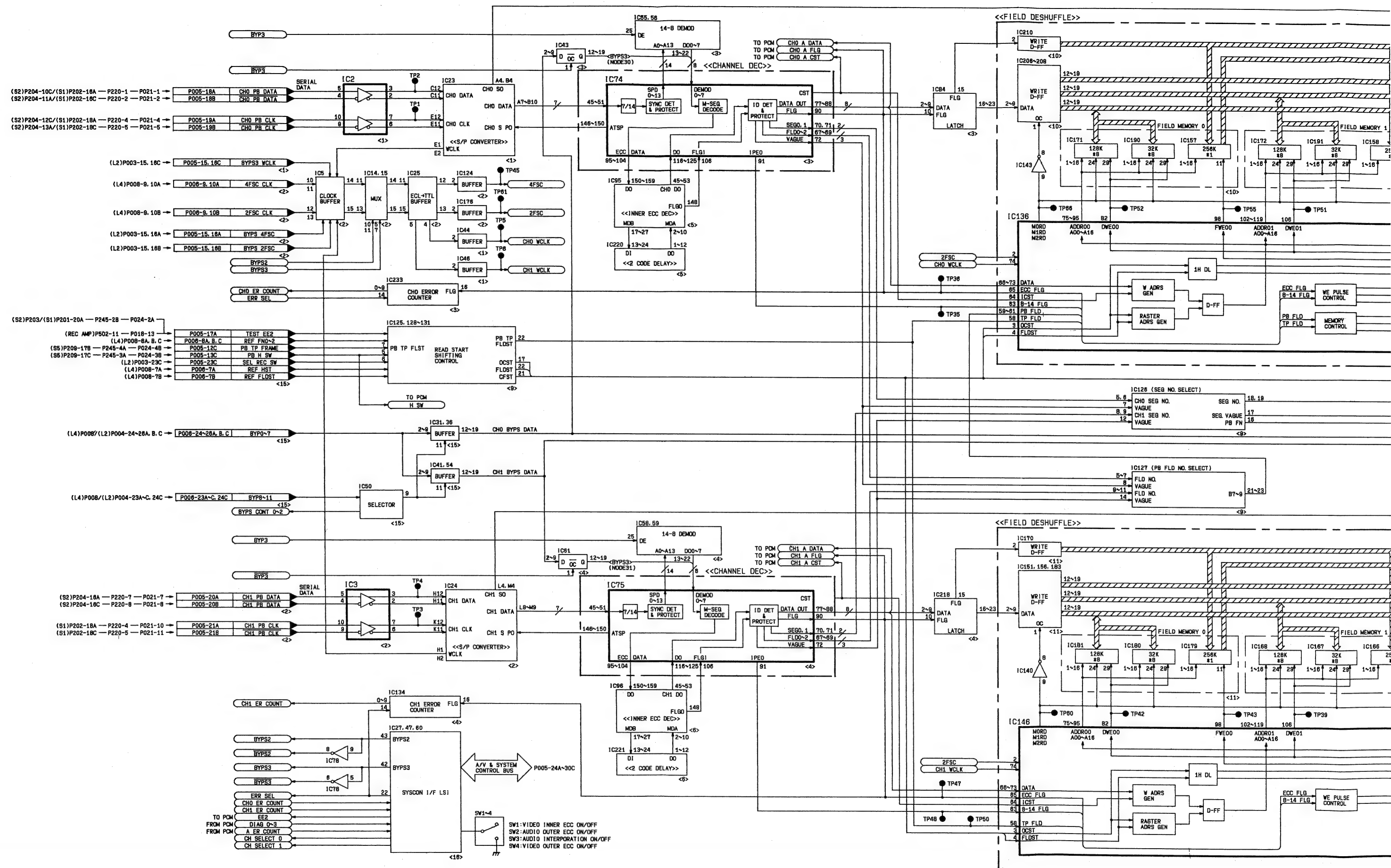


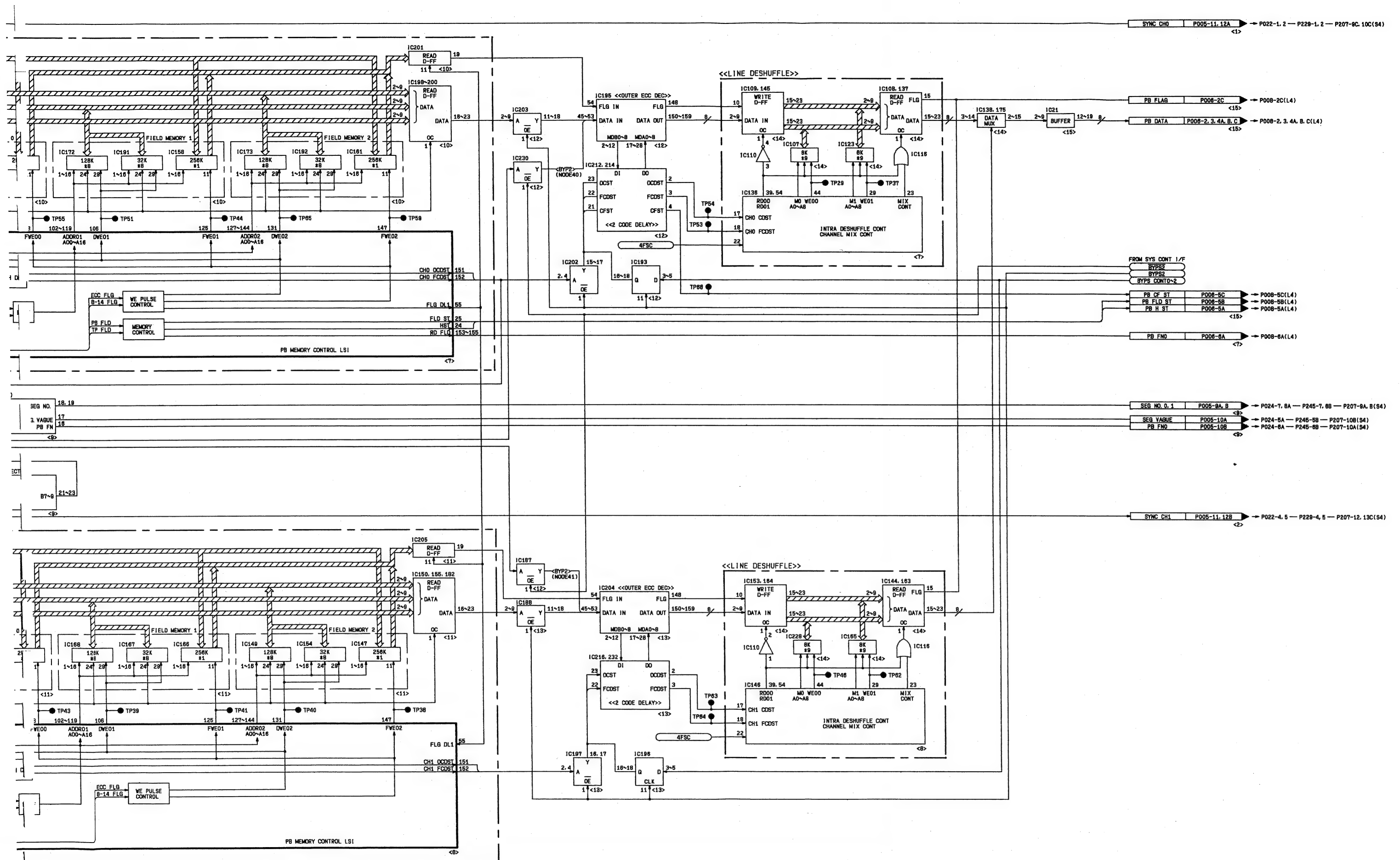


L2 VIDEO/AUDIO REC BLOCK DIAGRAM

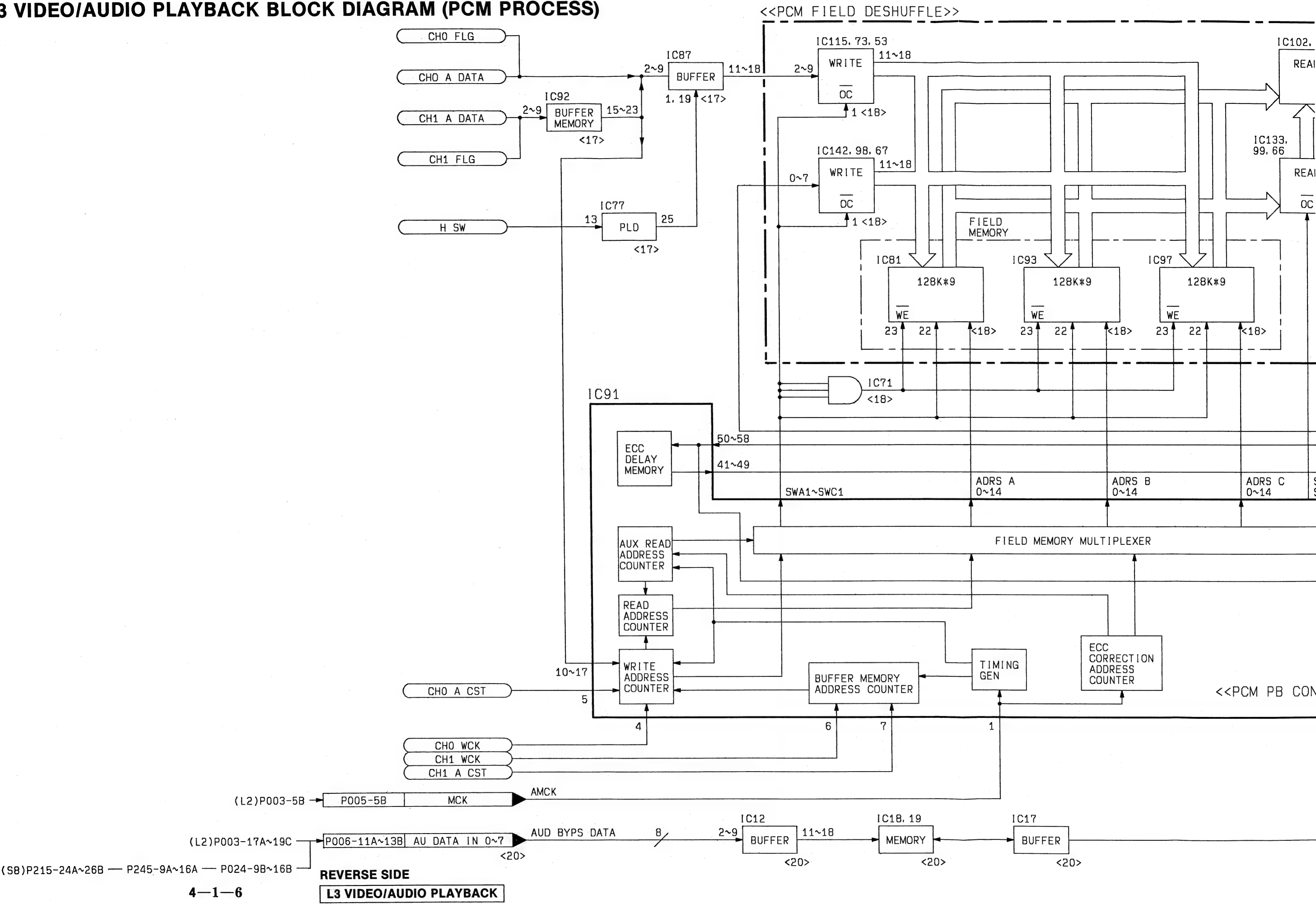


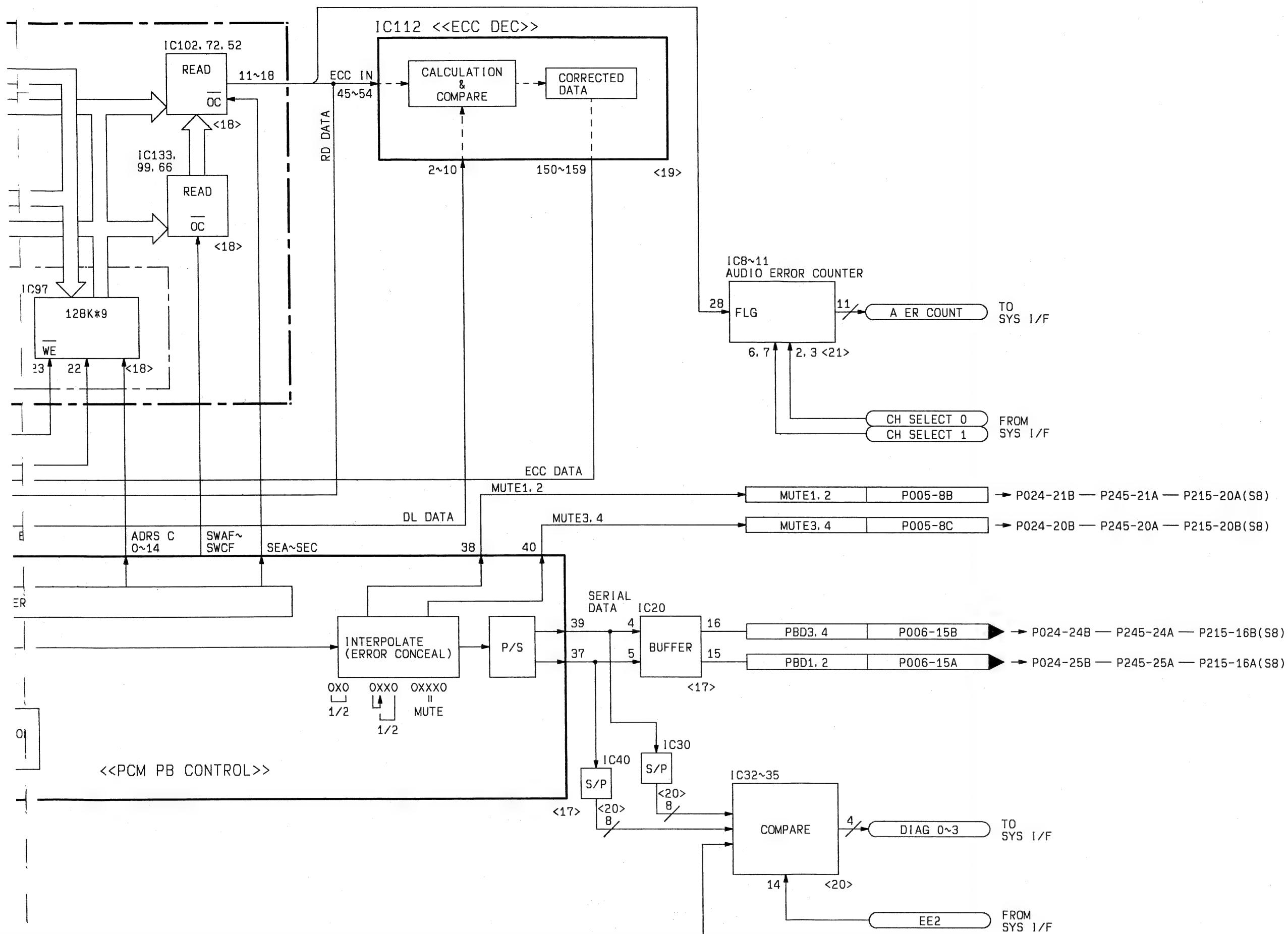
L3 VIDEO/AUDIO PLAYBACK BLOCK DIAGRAM



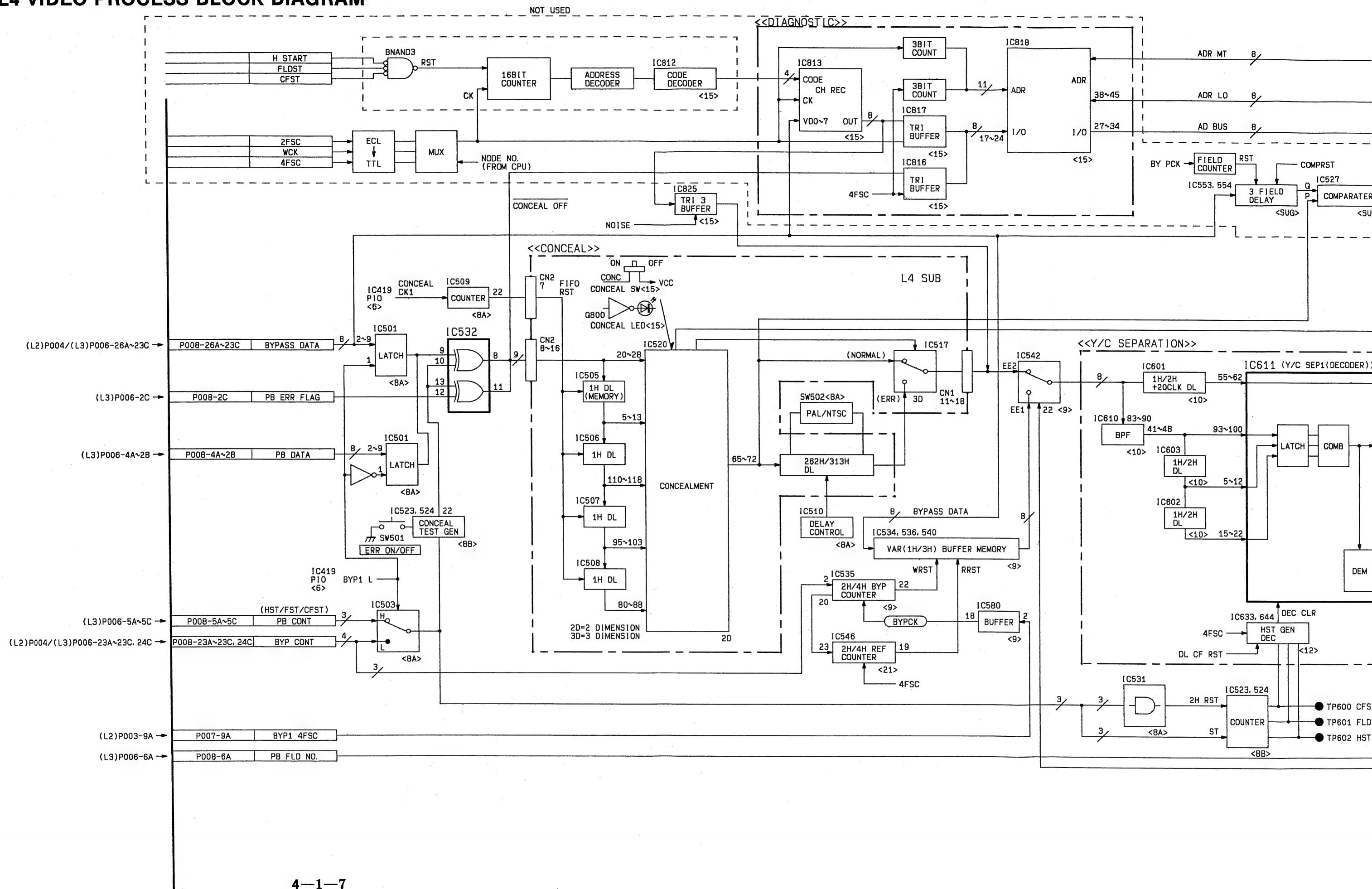


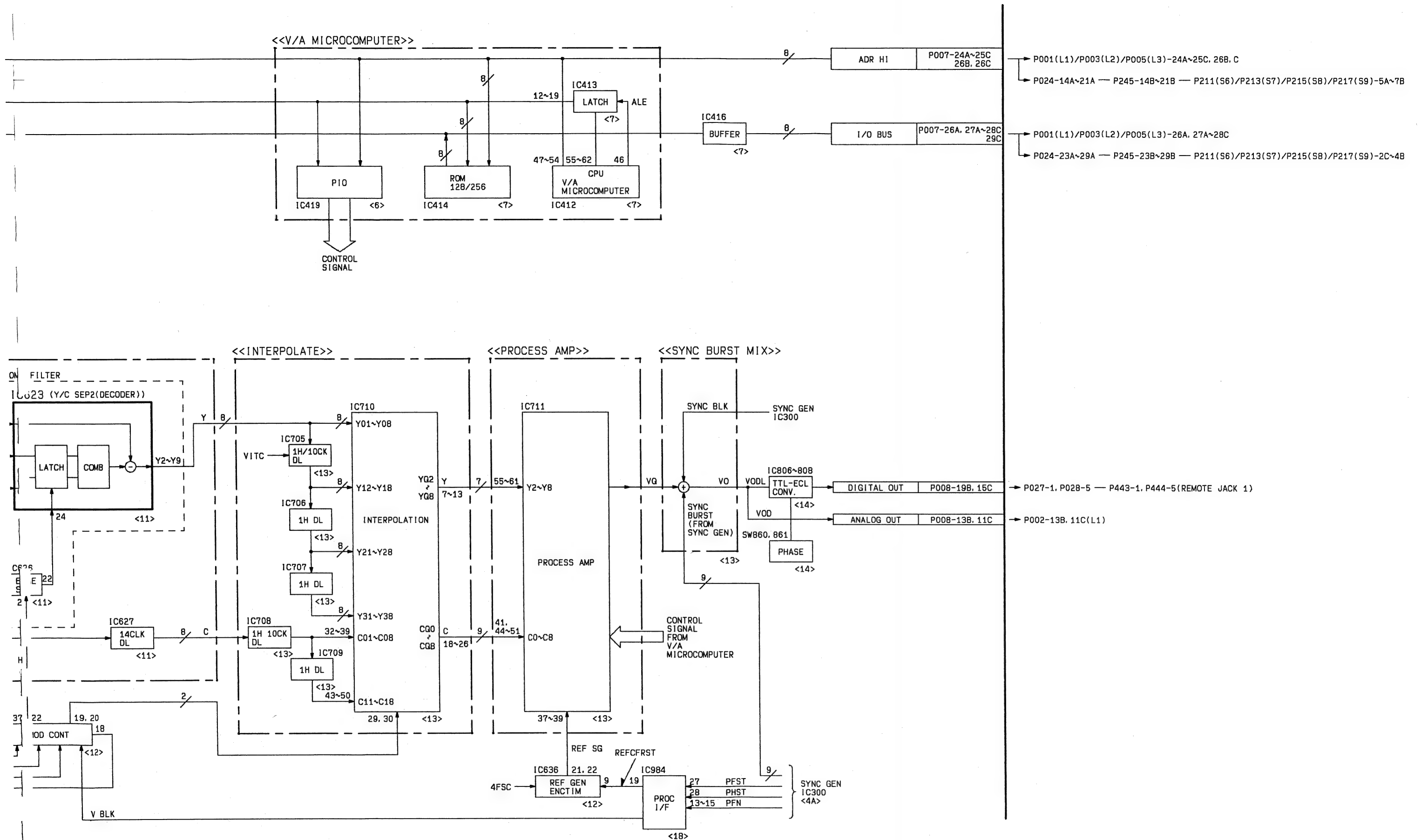
L3 VIDEO/AUDIO PLAYBACK BLOCK DIAGRAM (PCM PROCESS)



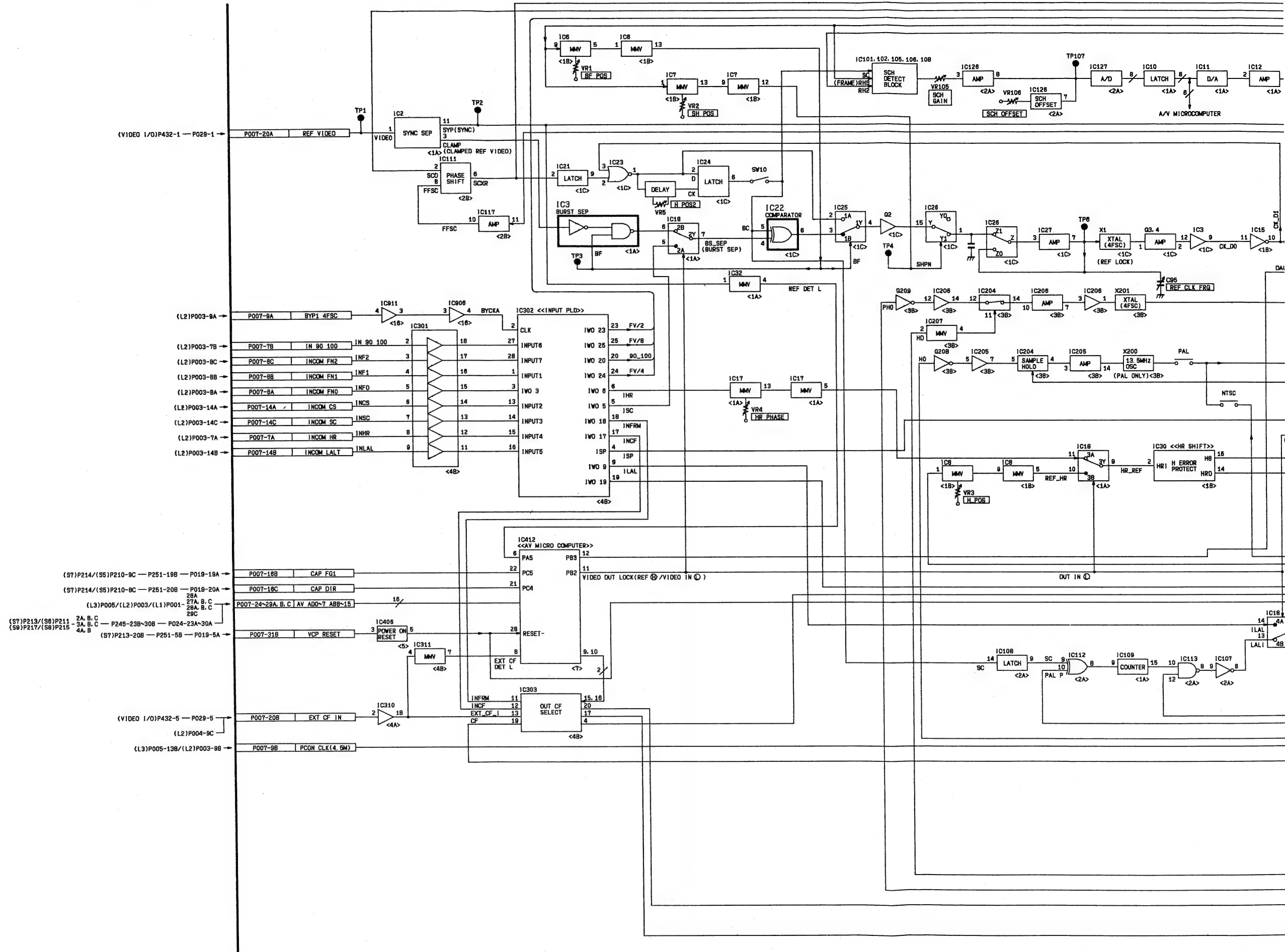


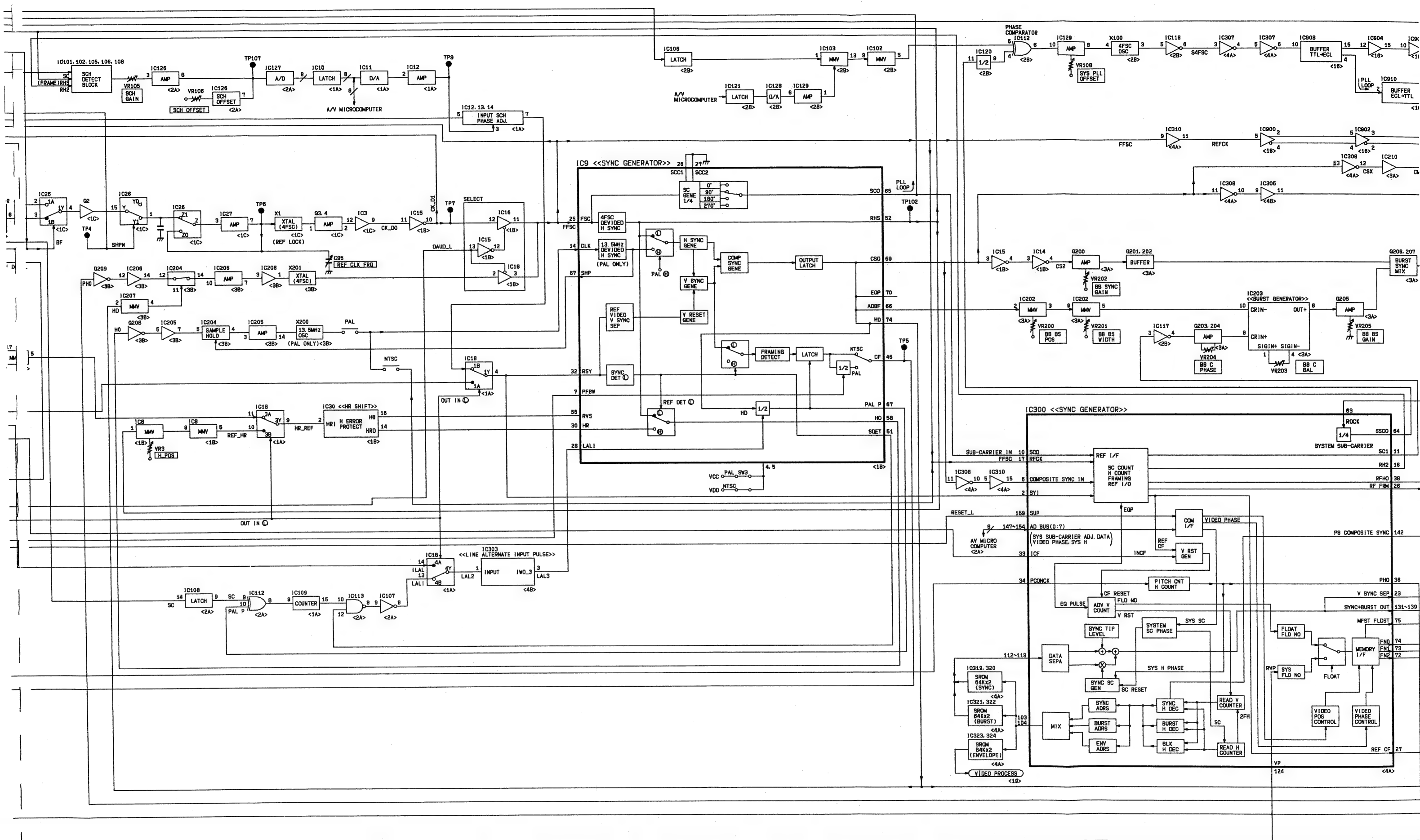
L4 VIDEO PROCESS BLOCK DIAGRAM

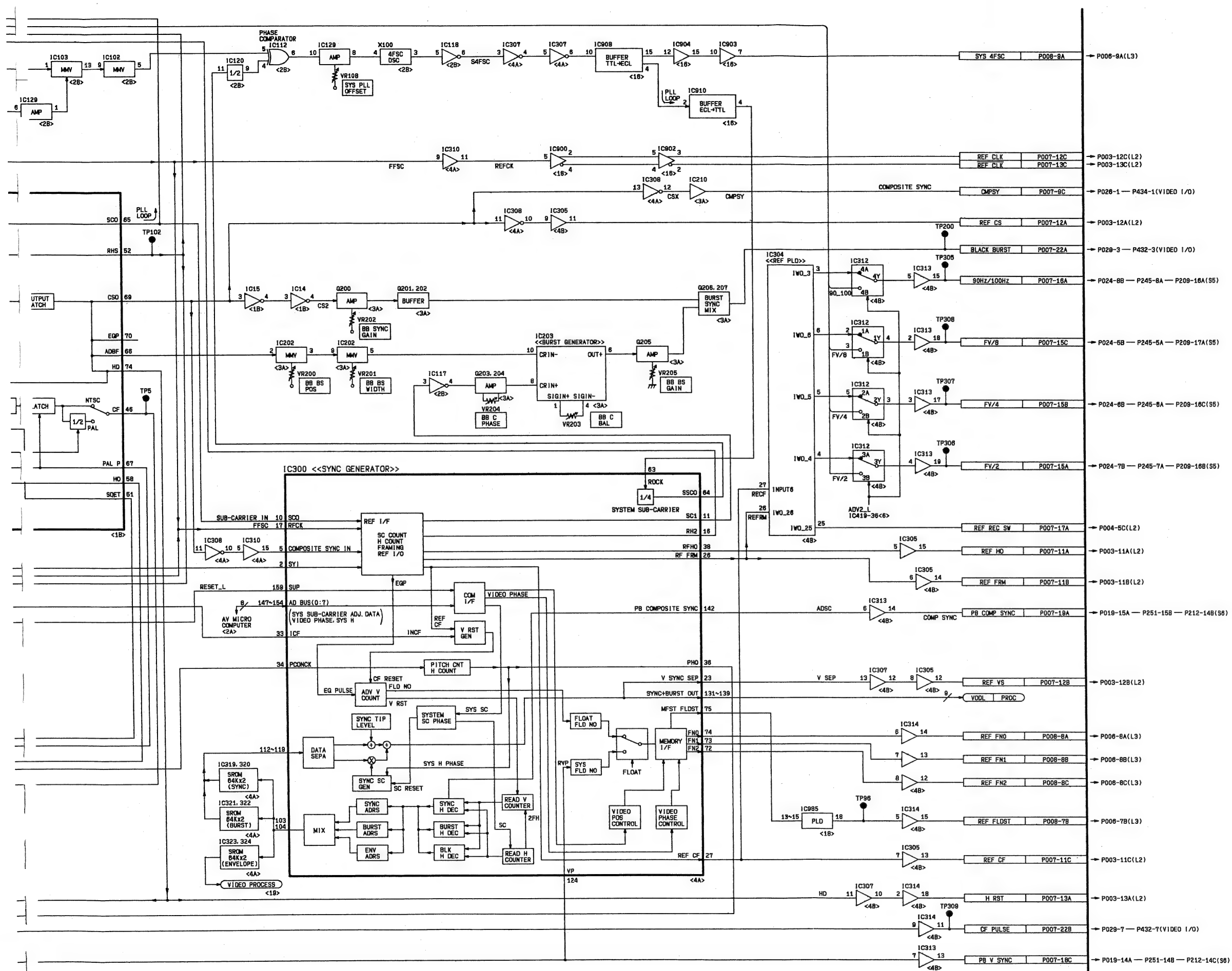




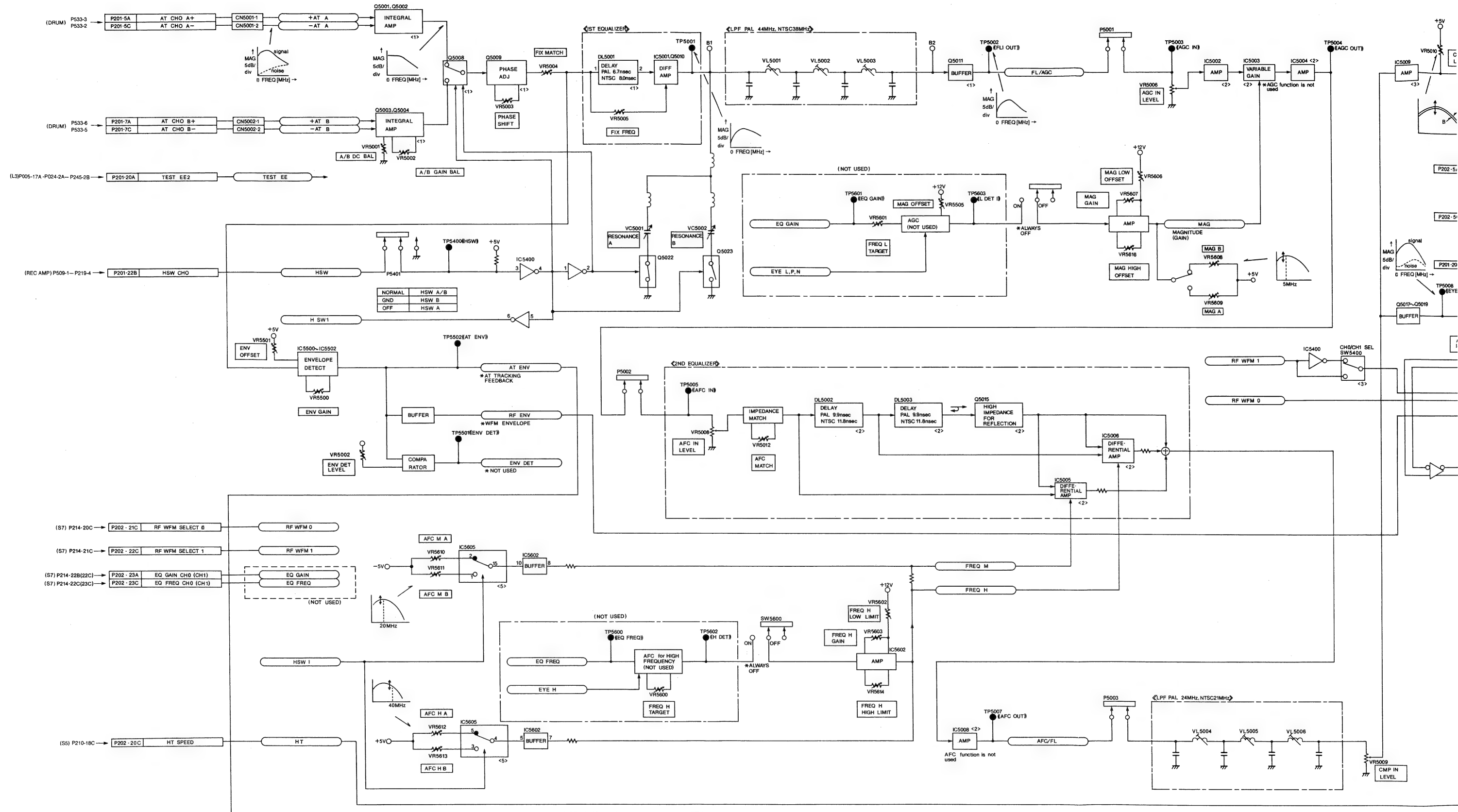
L4 SYNC GENERATOR BLOCK DIAGRAM

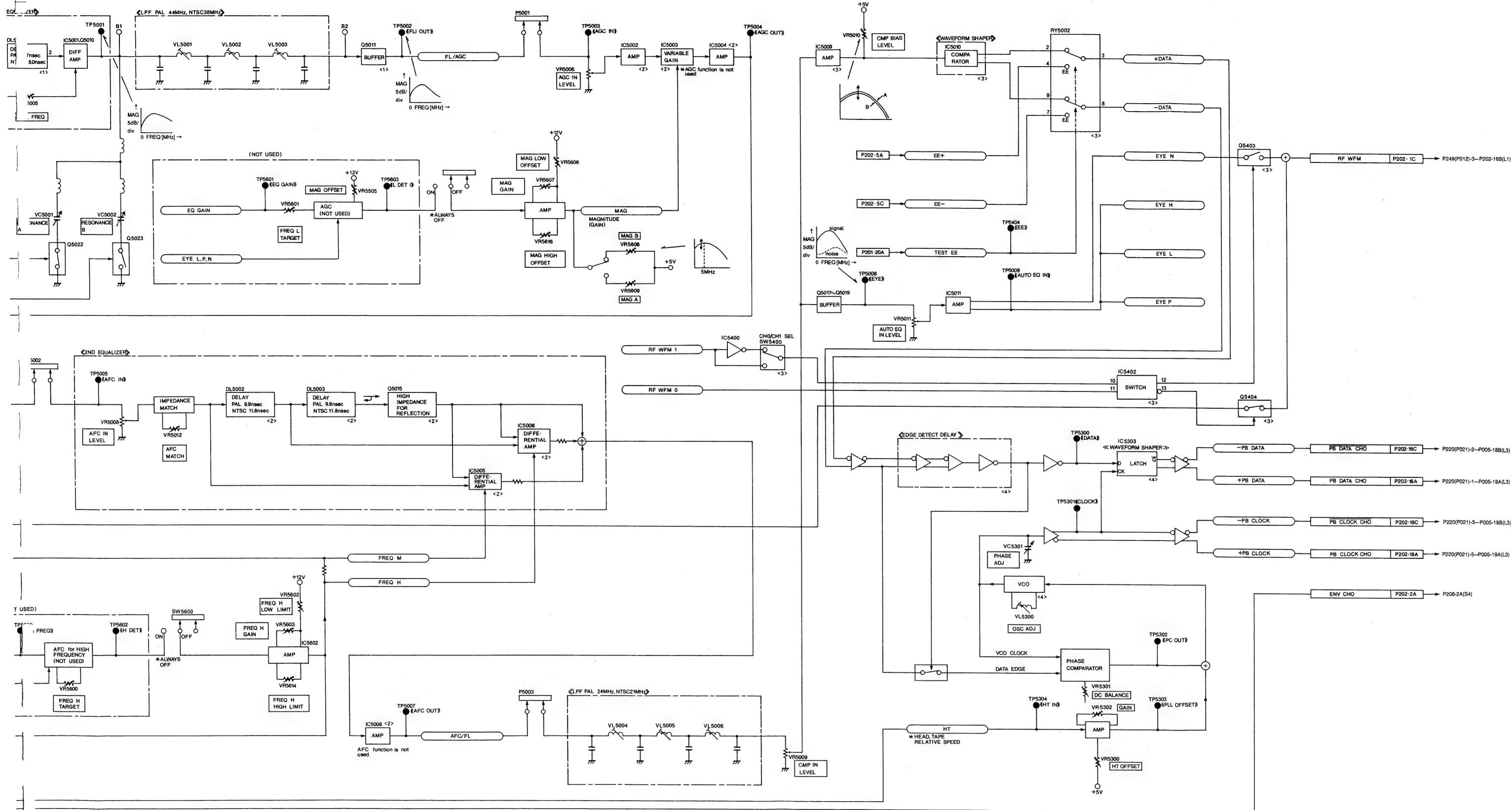




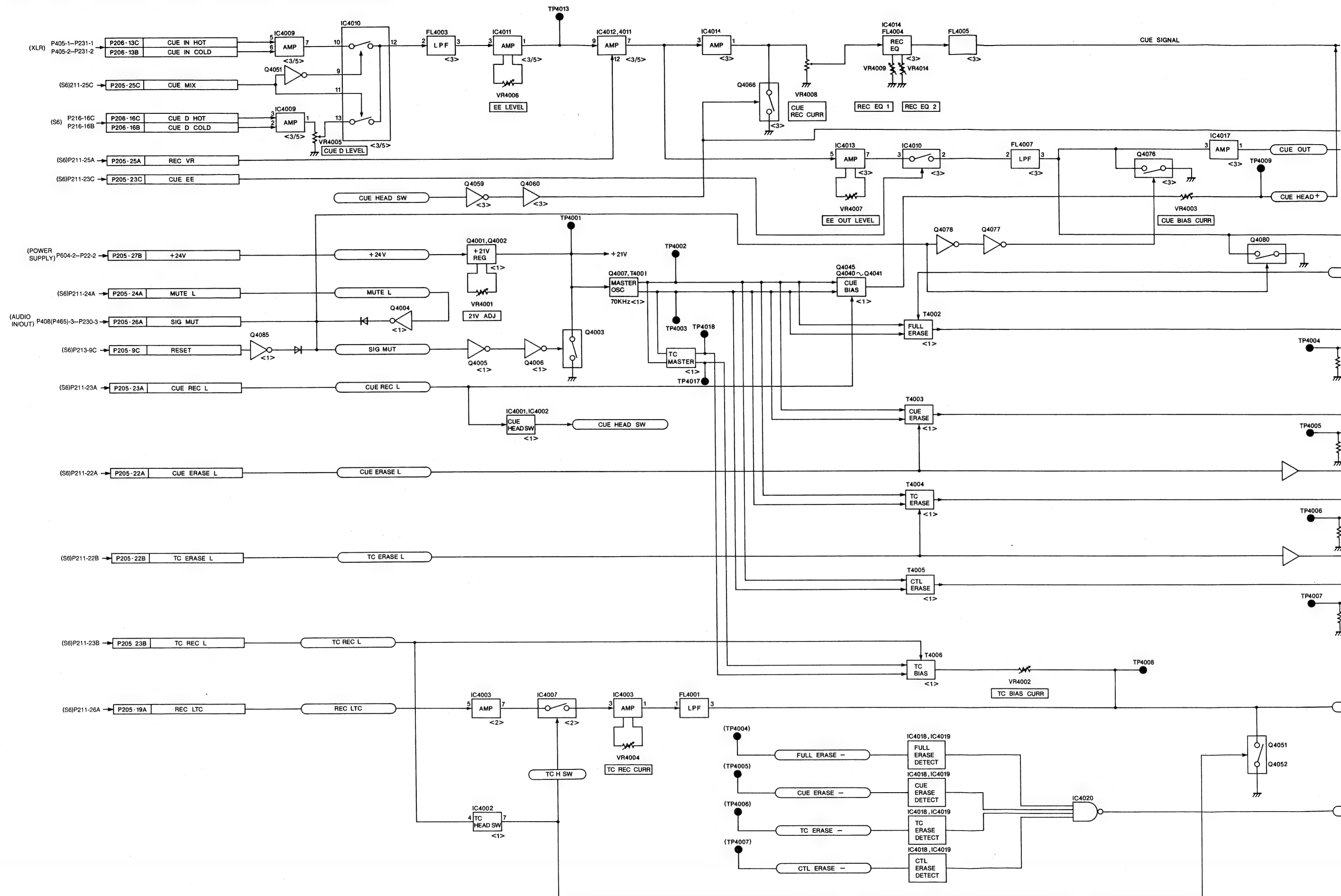


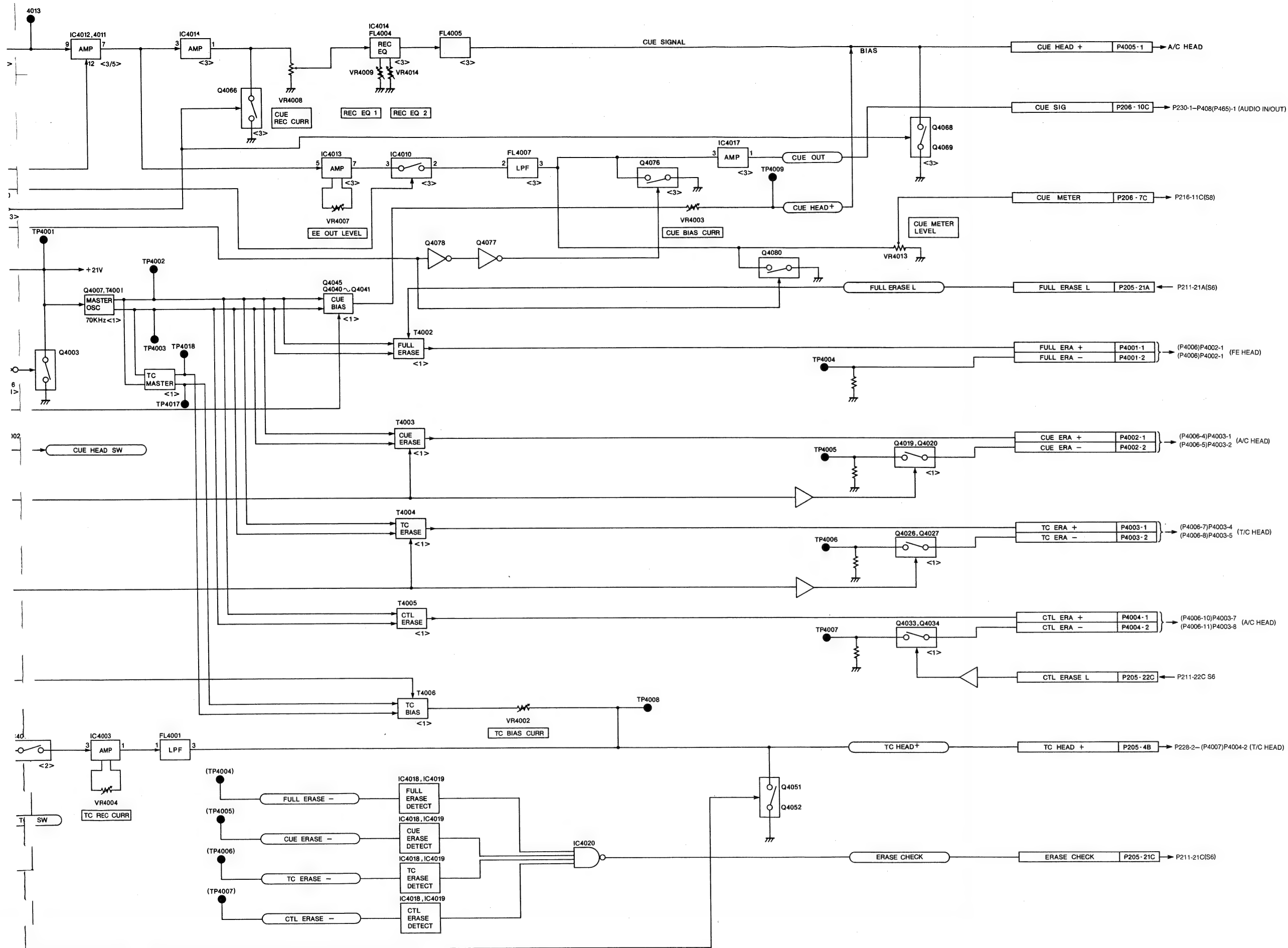
S1, S2 EQUALIZER CH0 (CH1) BLOCK DIAGRAM



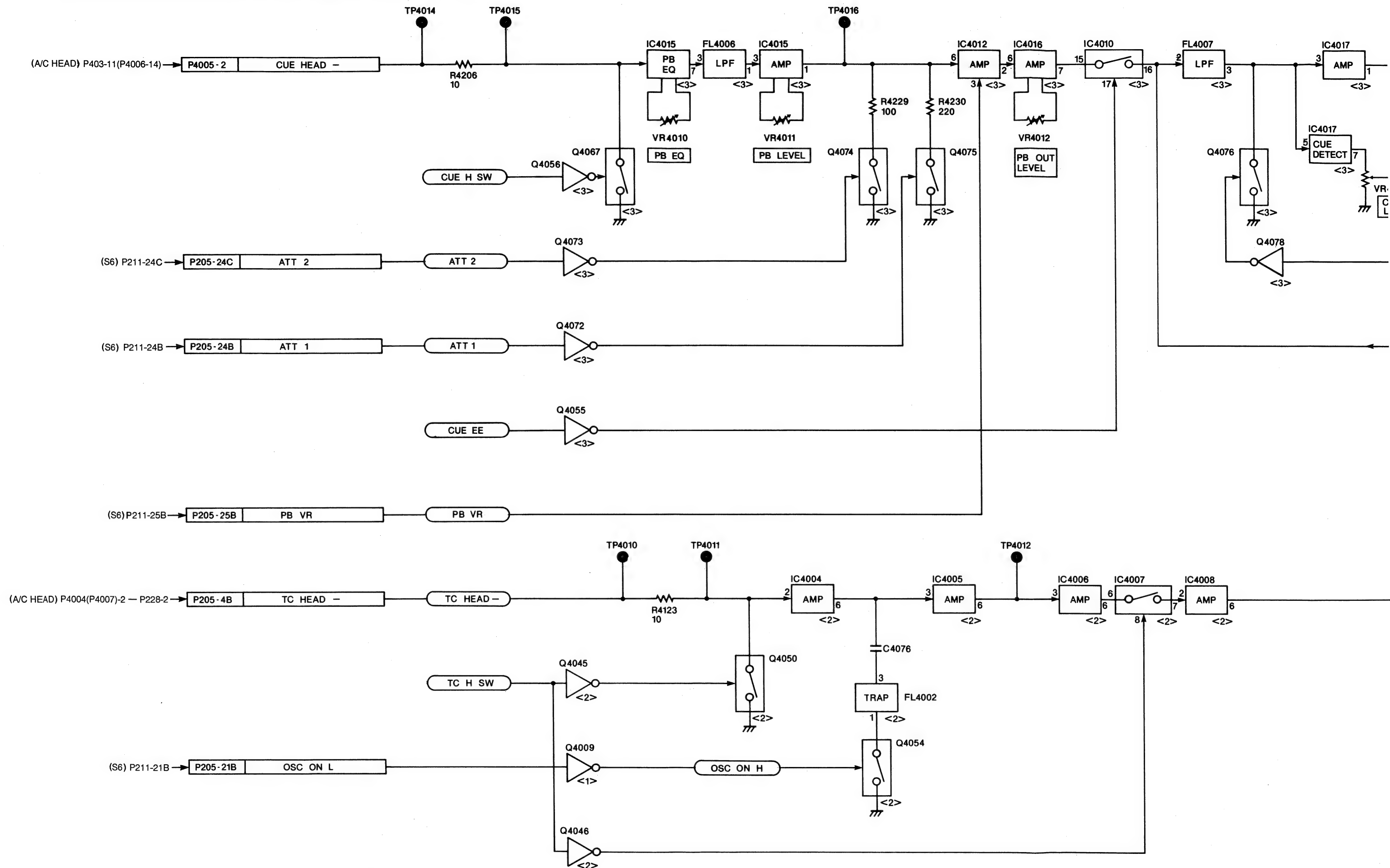


S3 CUE AUDIO REC BLOCK DIAGRAM

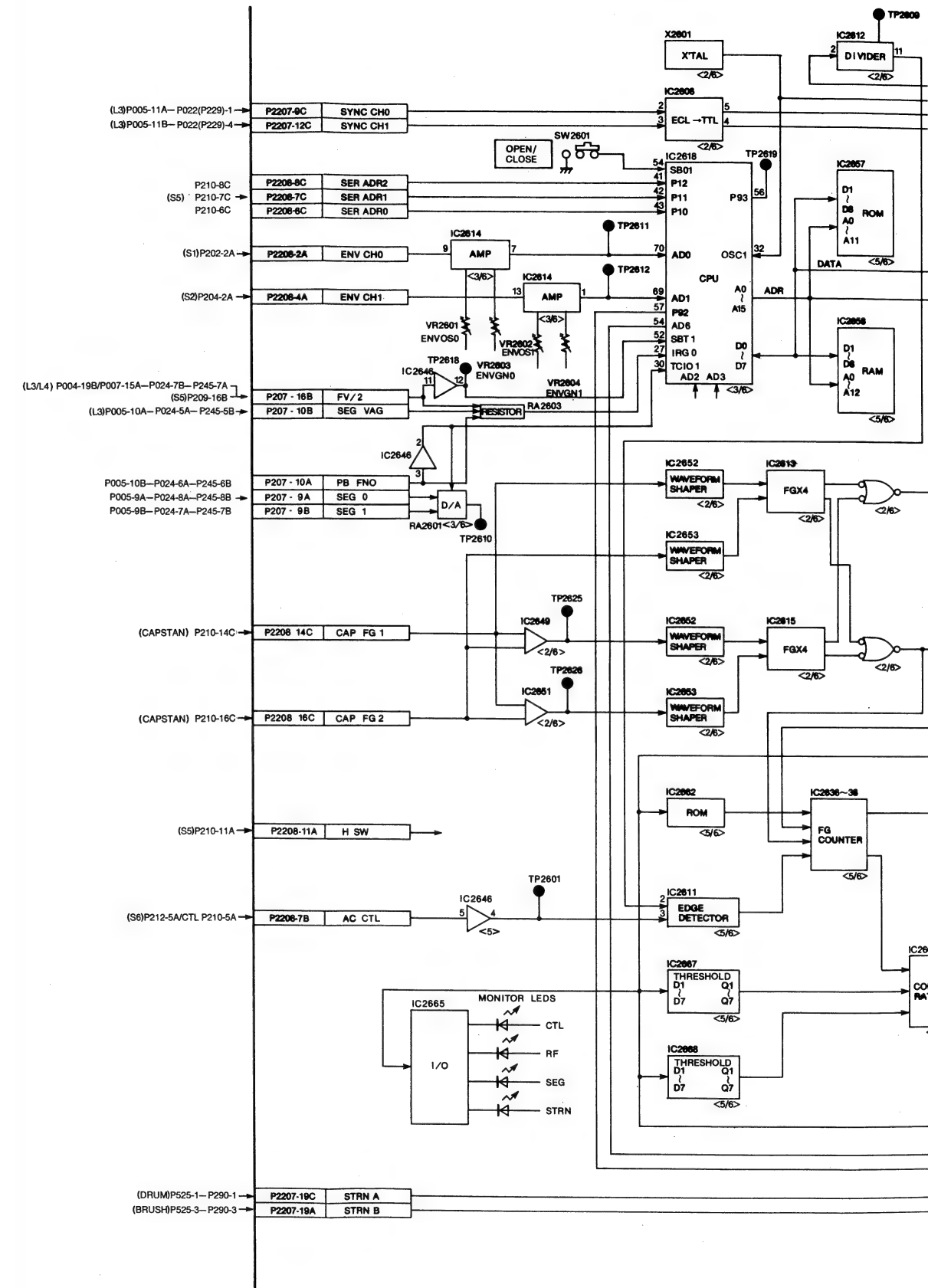
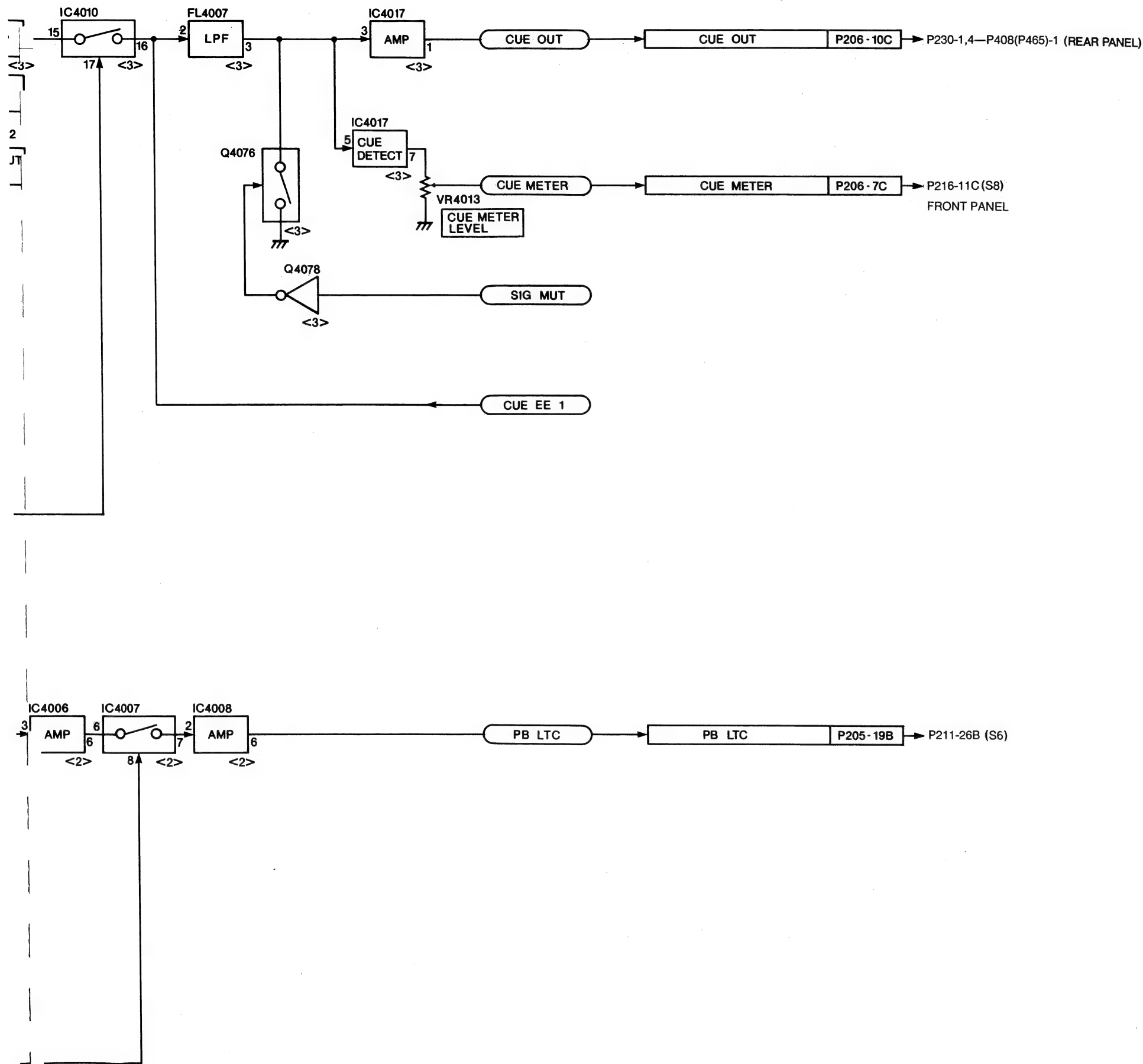




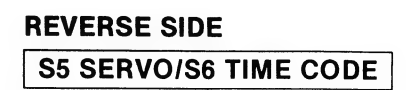
S3 CUE AUDIO PLAYBACK BLOCK DIAGRAM



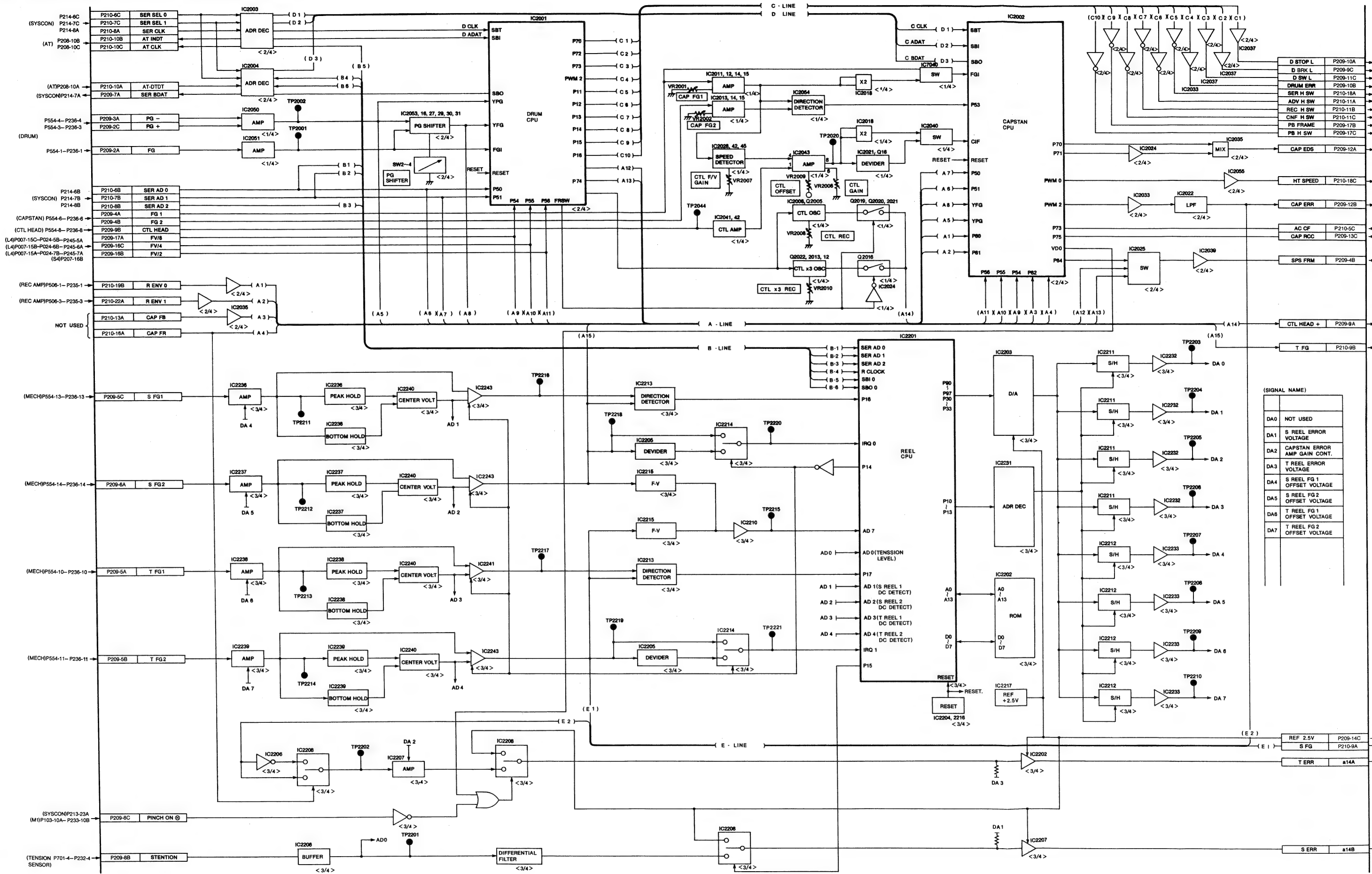
S4 AUTO TRACKING BLOCK DIAGRAM



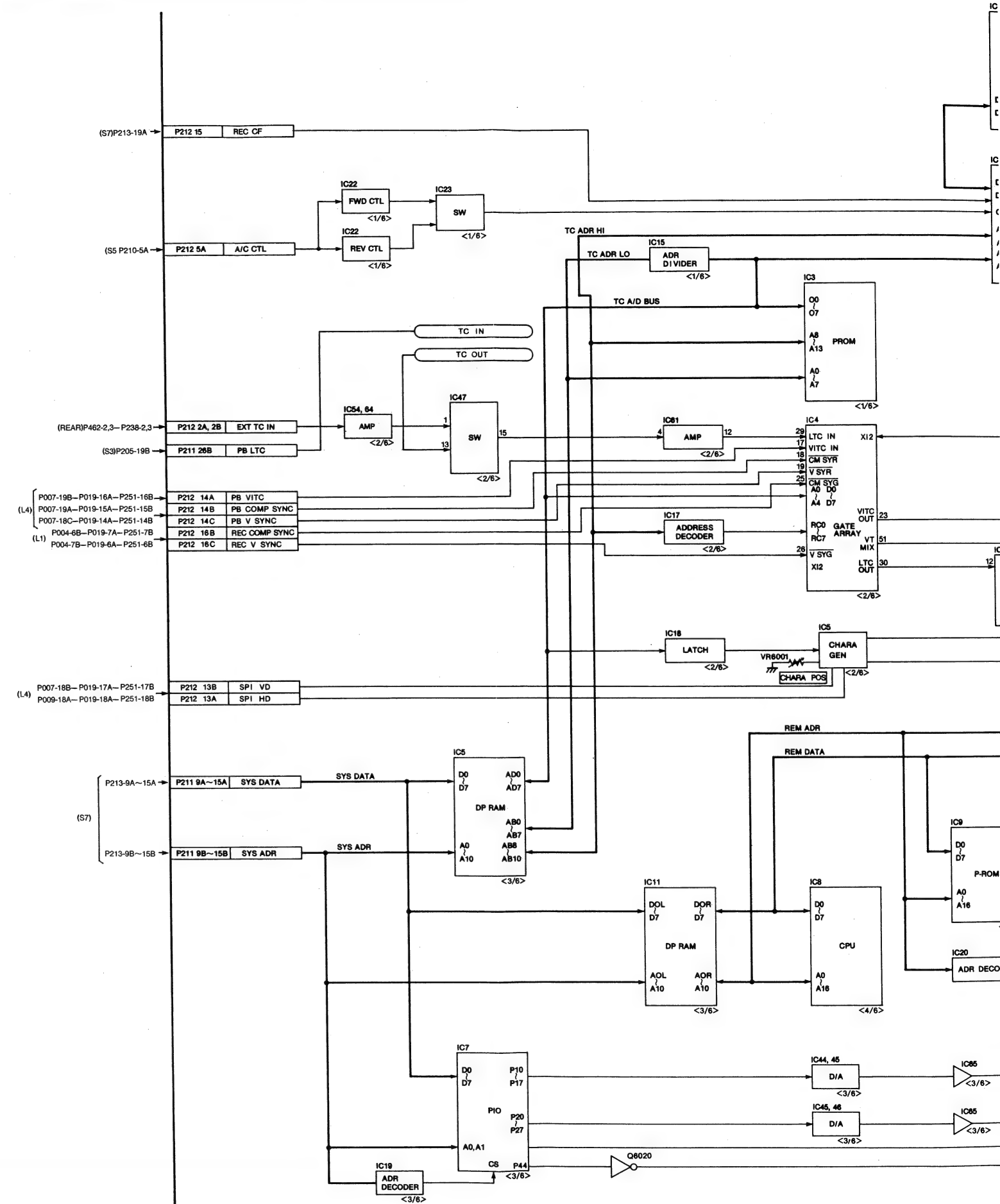
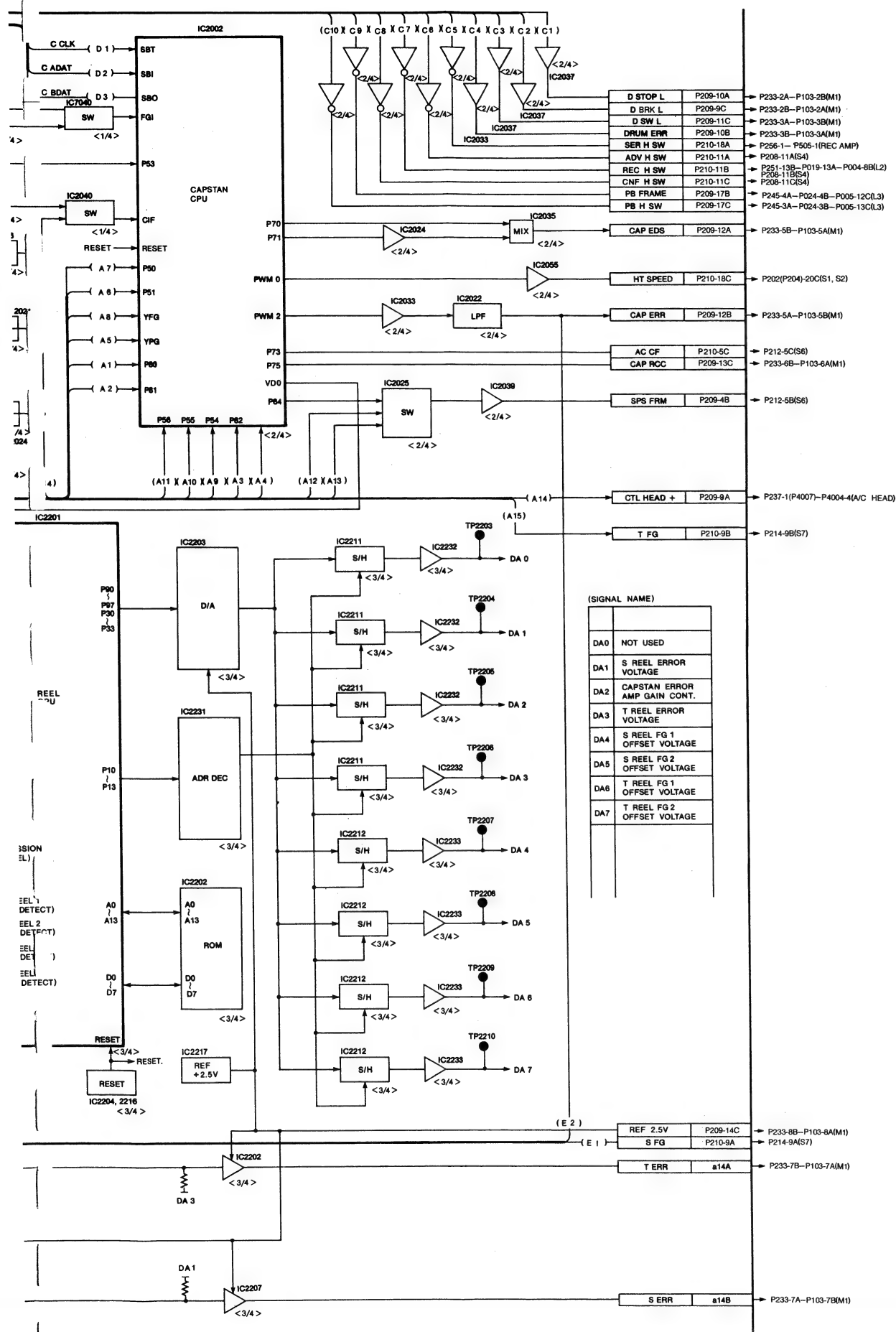
**S3 CUE AUDIO PLAYBACK/
S4 AUTO TRACKING**



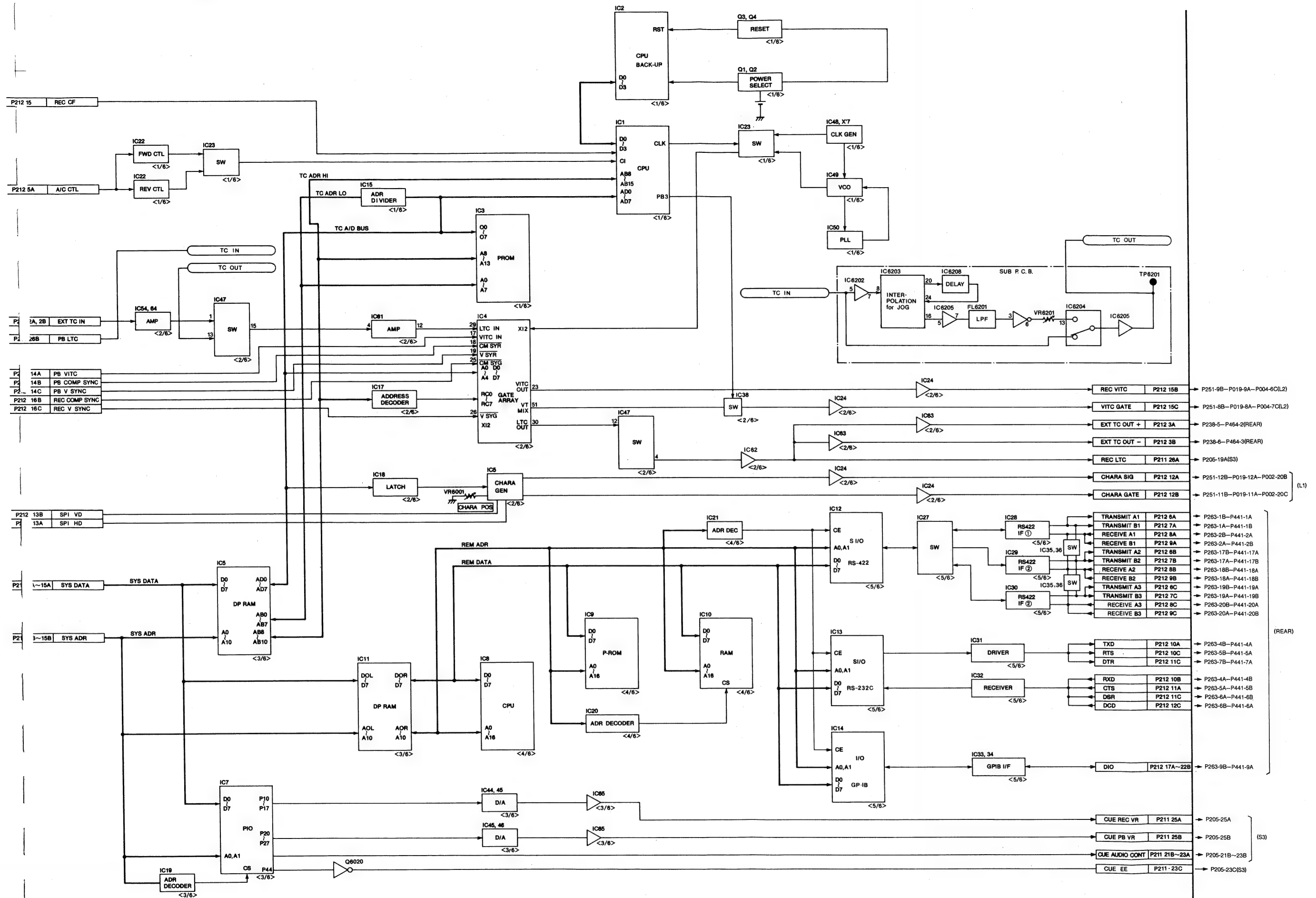
S5 SERVO BLOCK DIAGRAM



S6 TIME CODE BLOCK DIAGRAM

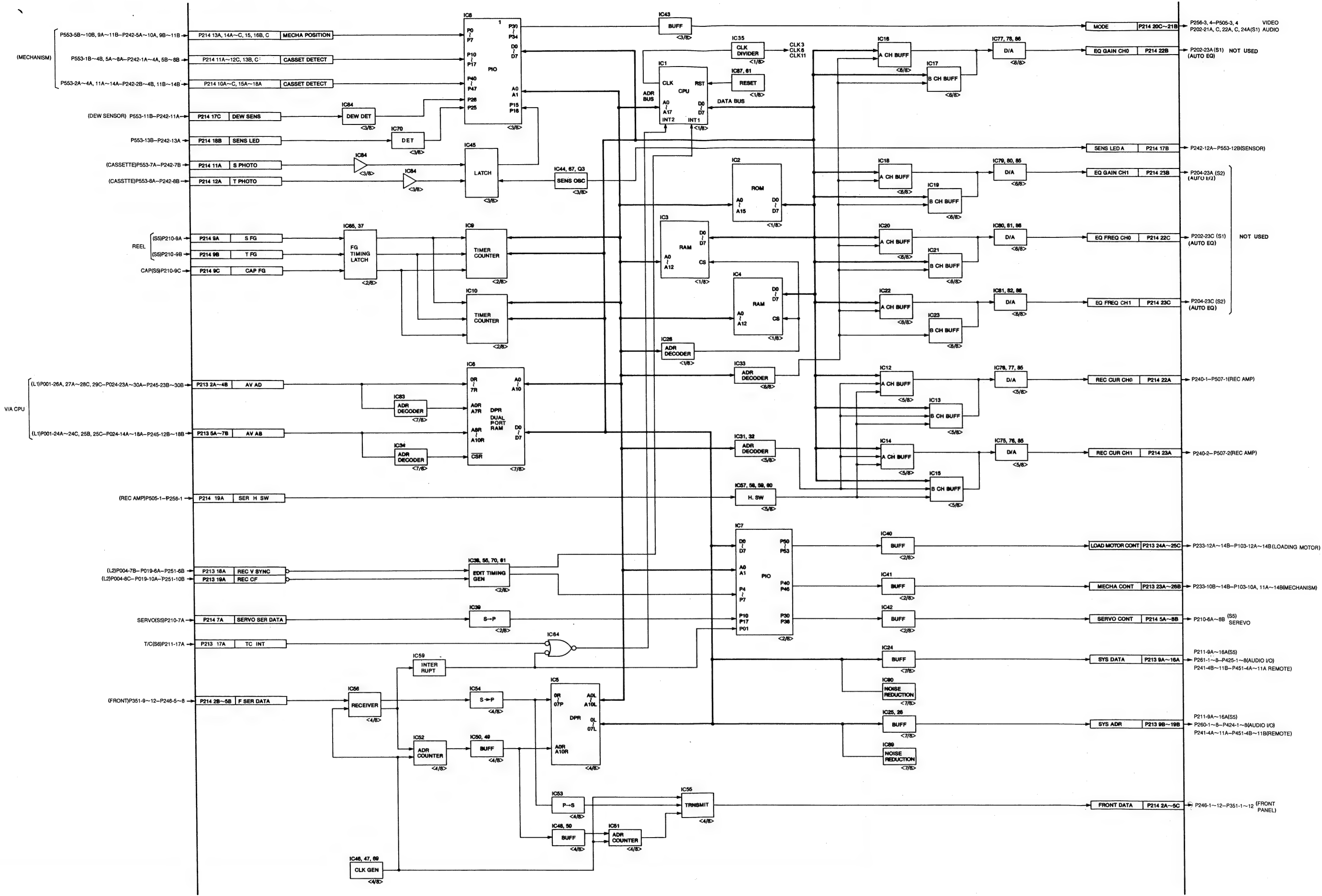


DE BLOCK DIAGRAM



S7 SYSTEM CONTROL BLOCK DIAGRAM

S8 AU



(L1)P002-4A

(L1)P002-4C

(L3)P006-15A

(L3)P006-15B

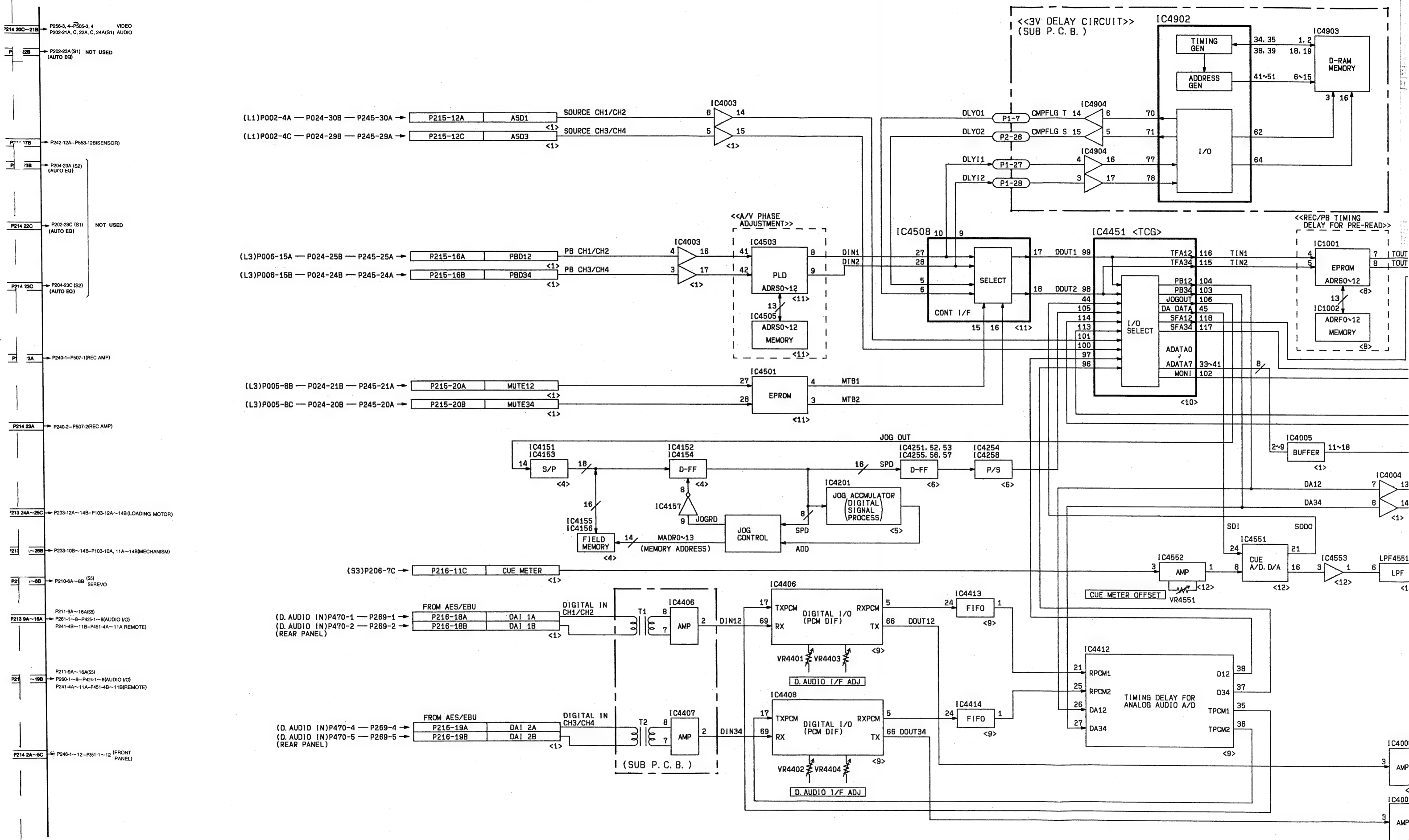
(L3)P005-8B

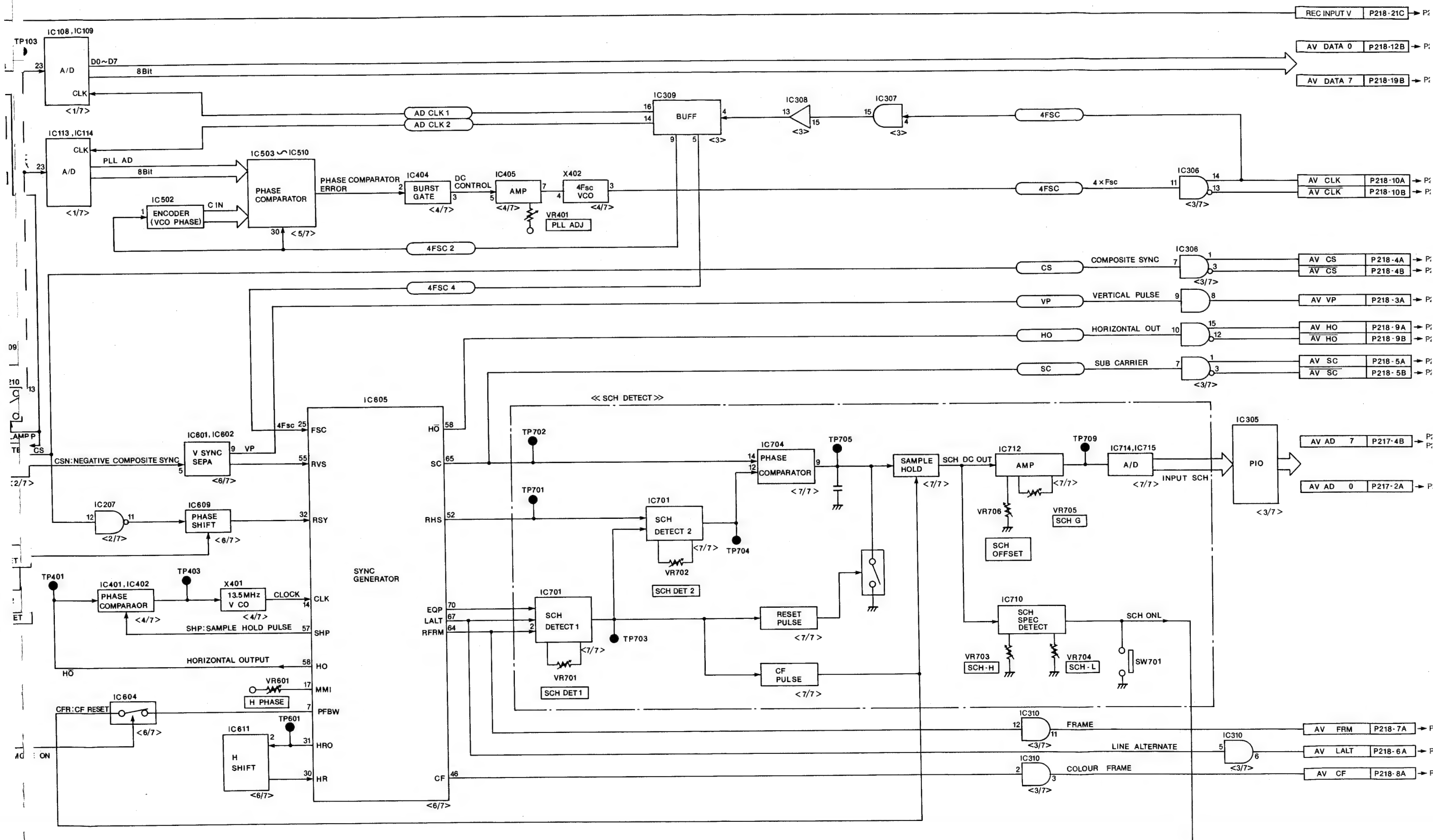
(L3)P005-8C

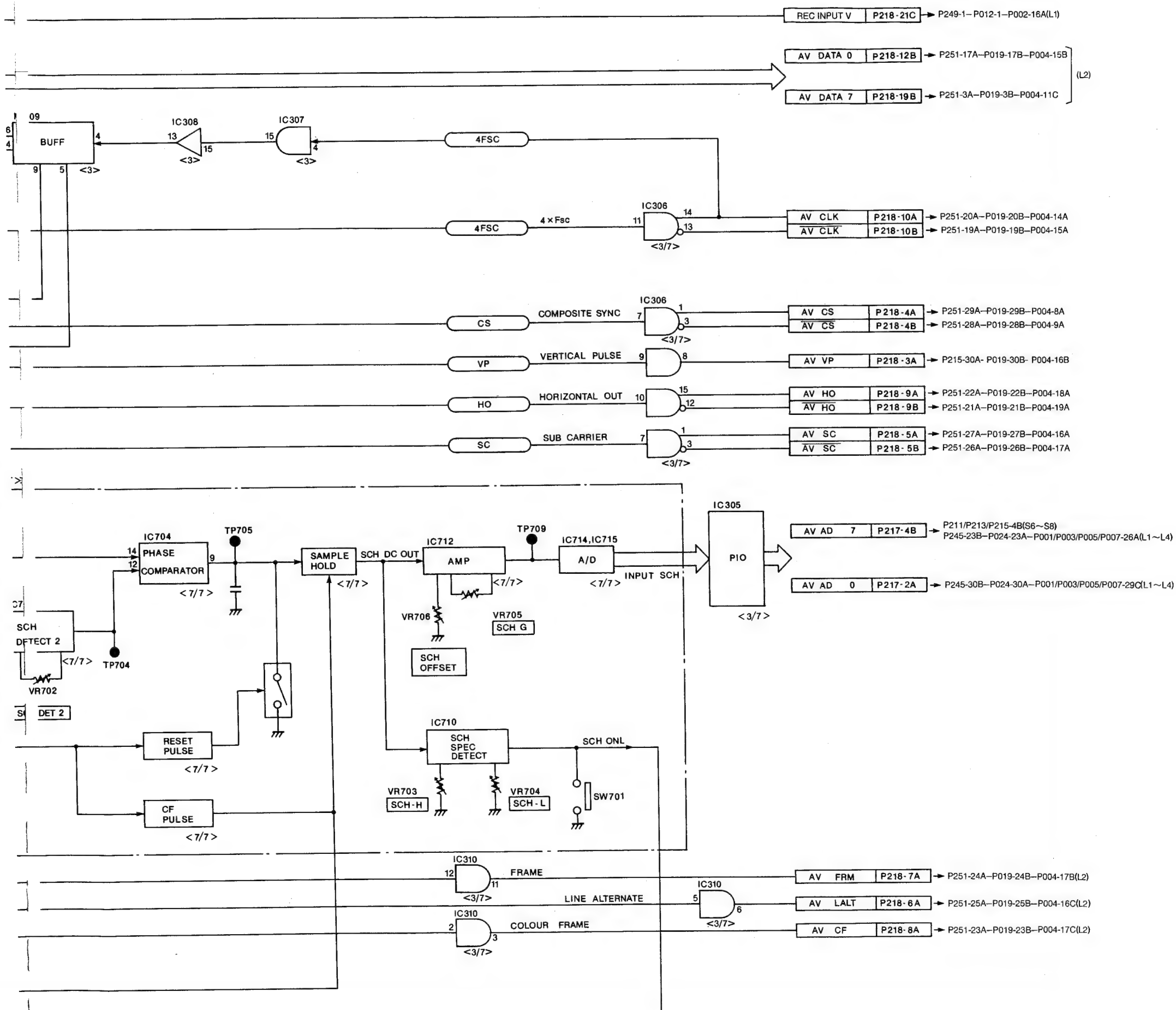
(D. AU
(D. AU
(REAR

(D. AU
(D. AU
(FRONT

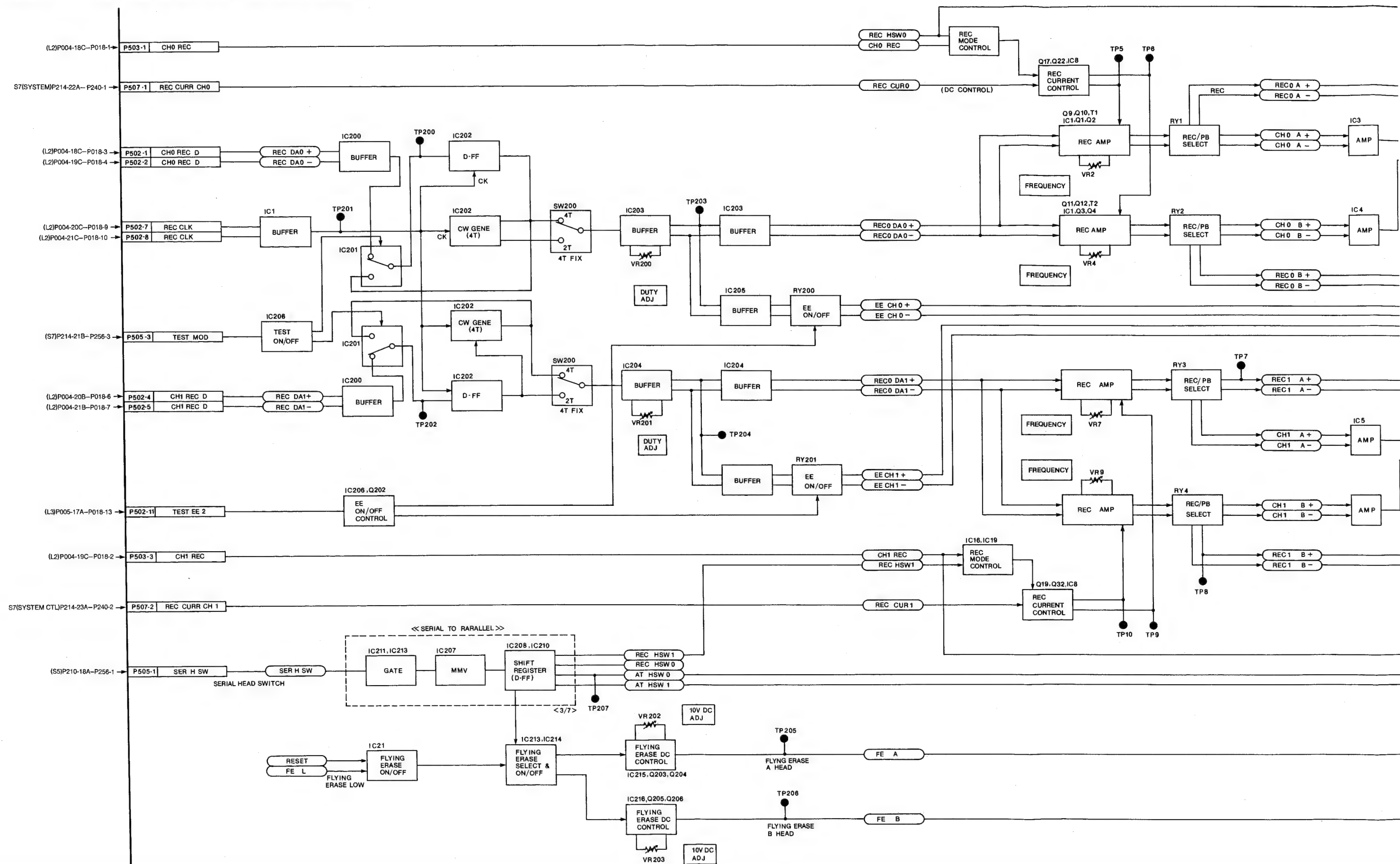
S8 AUDIO PROCESS BLOCK DIAGRAM

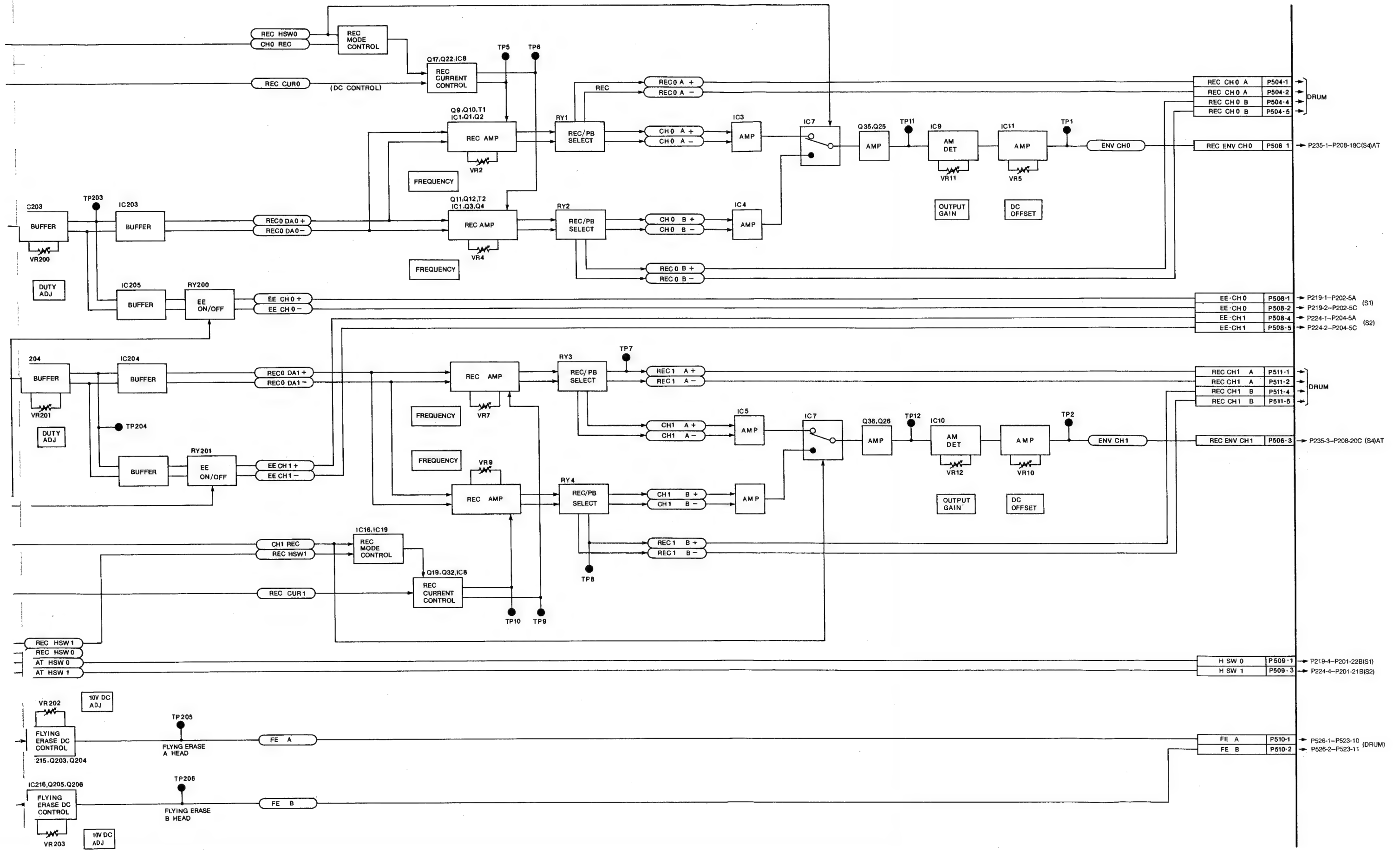




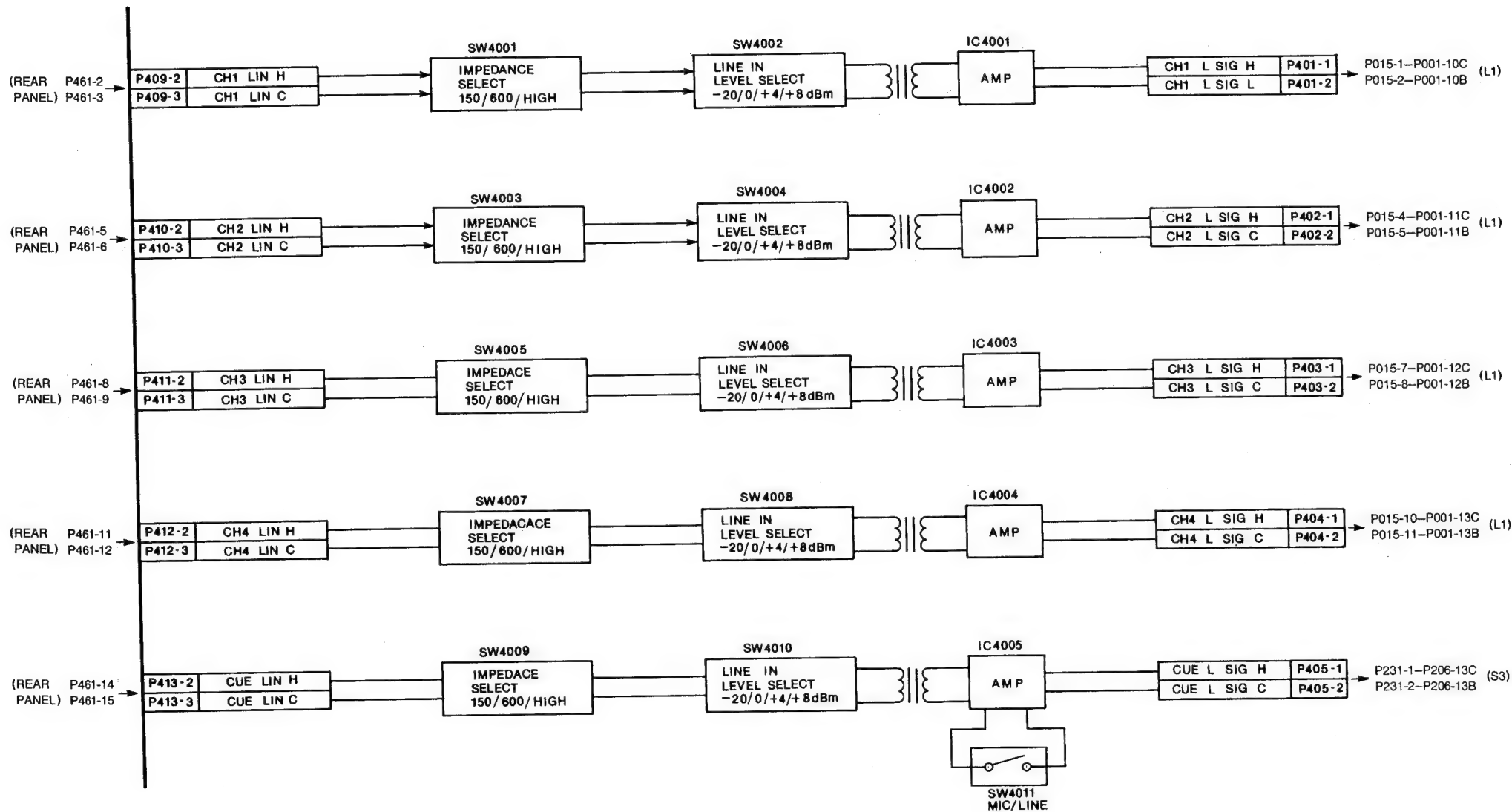


REC AMPLIFIER BLOCK DIAGRAM

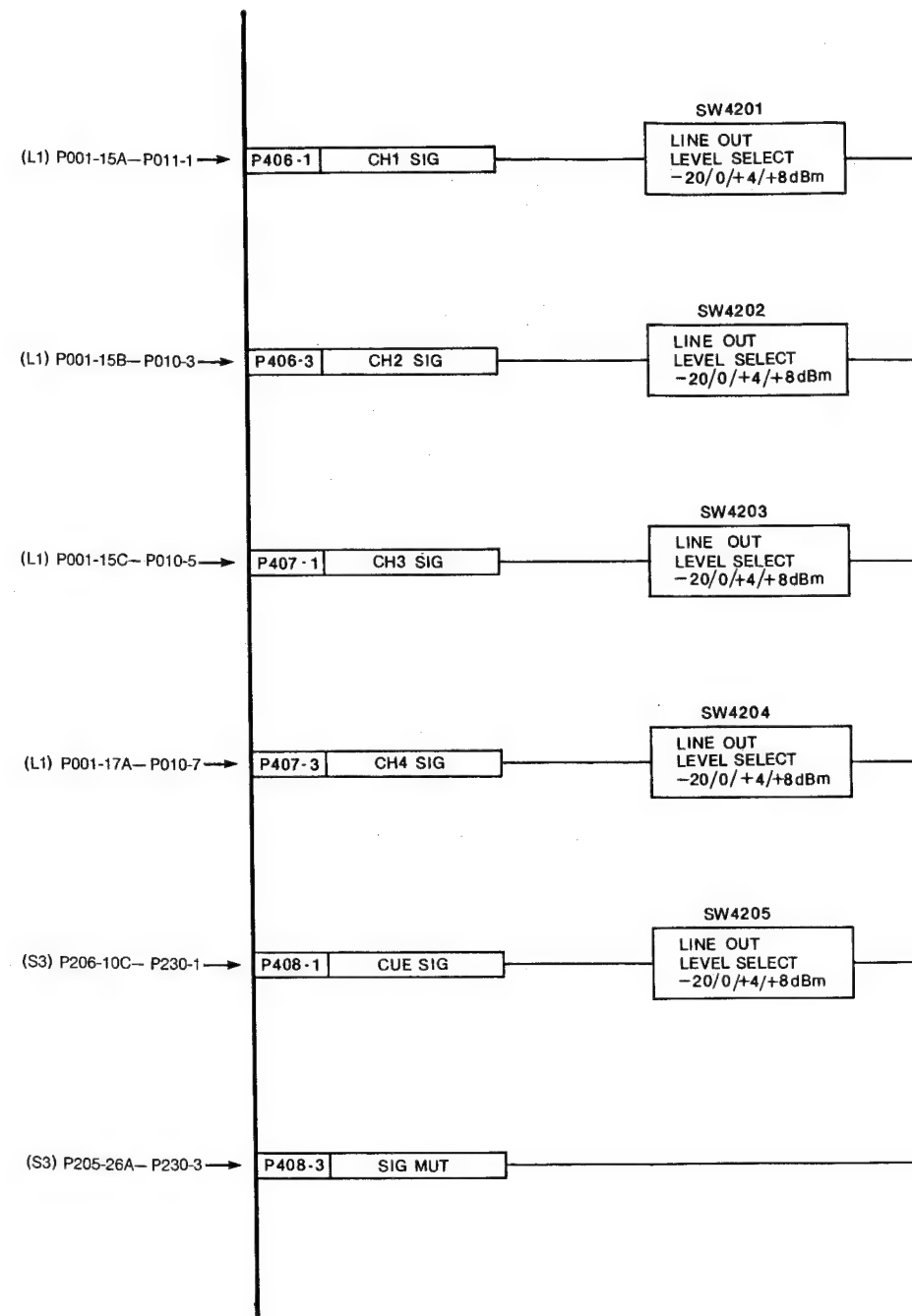




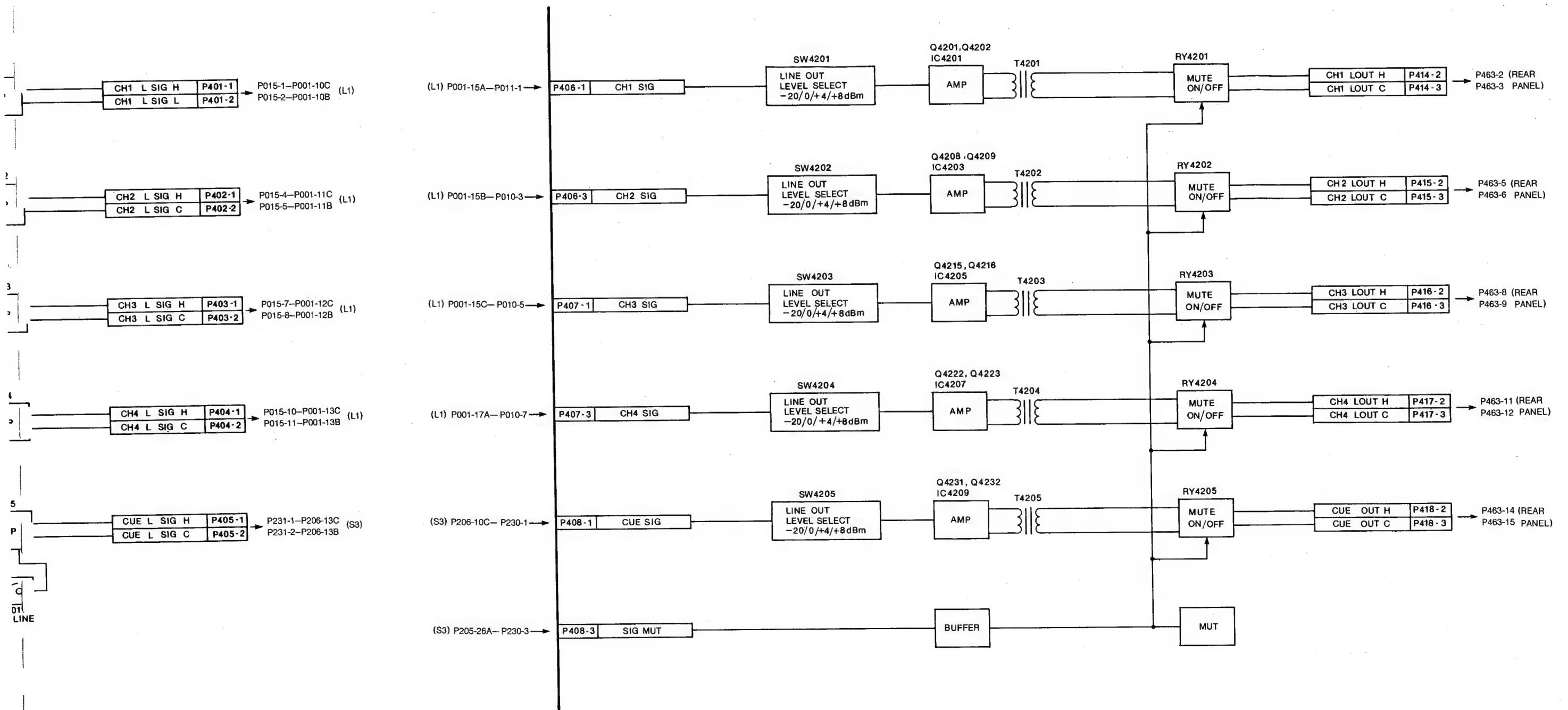
AUDIO IN BLOCK DIAGRAM



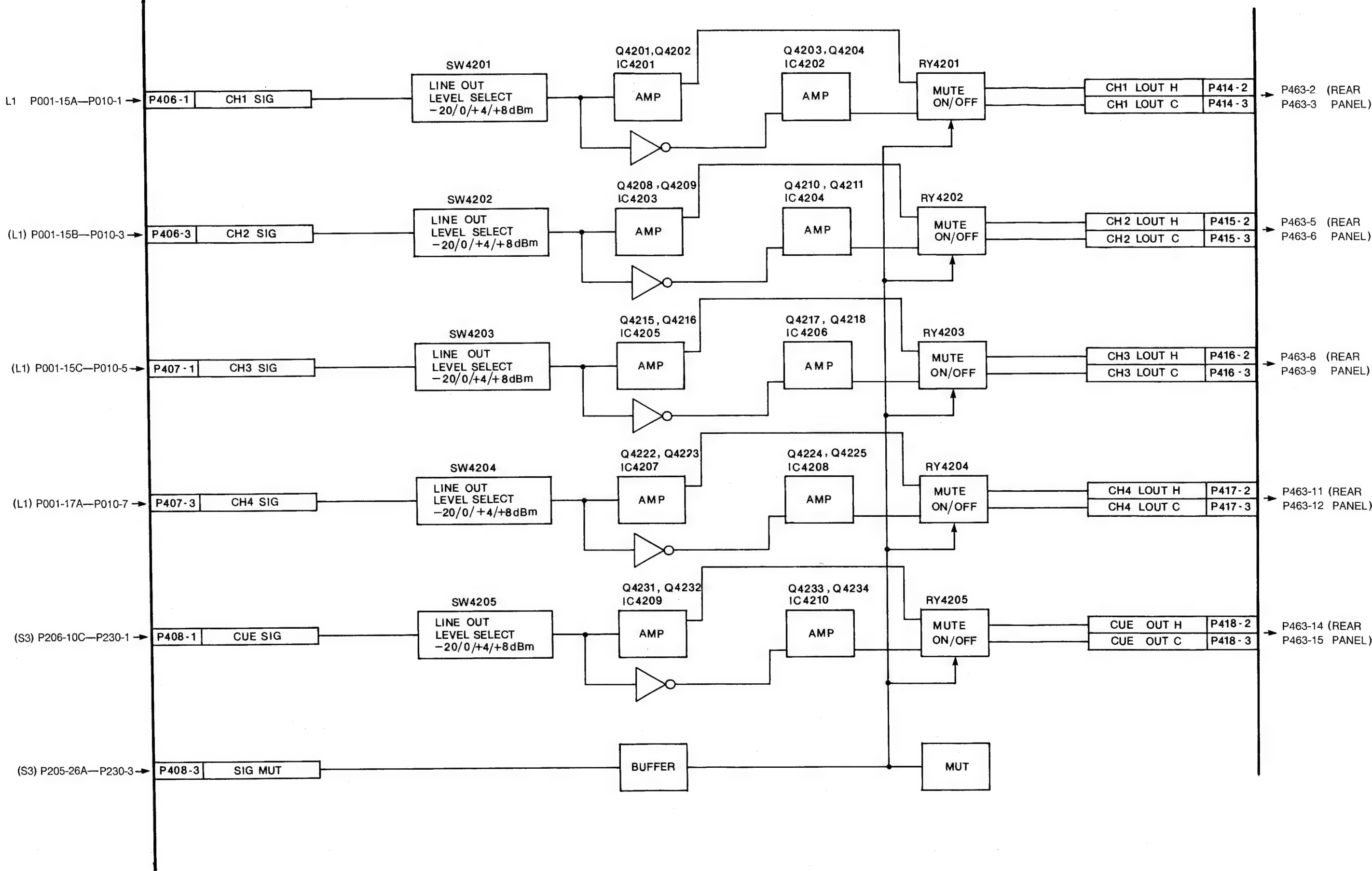
AUDIO OUT BLOCK DIAGRAM [FOR PAL]



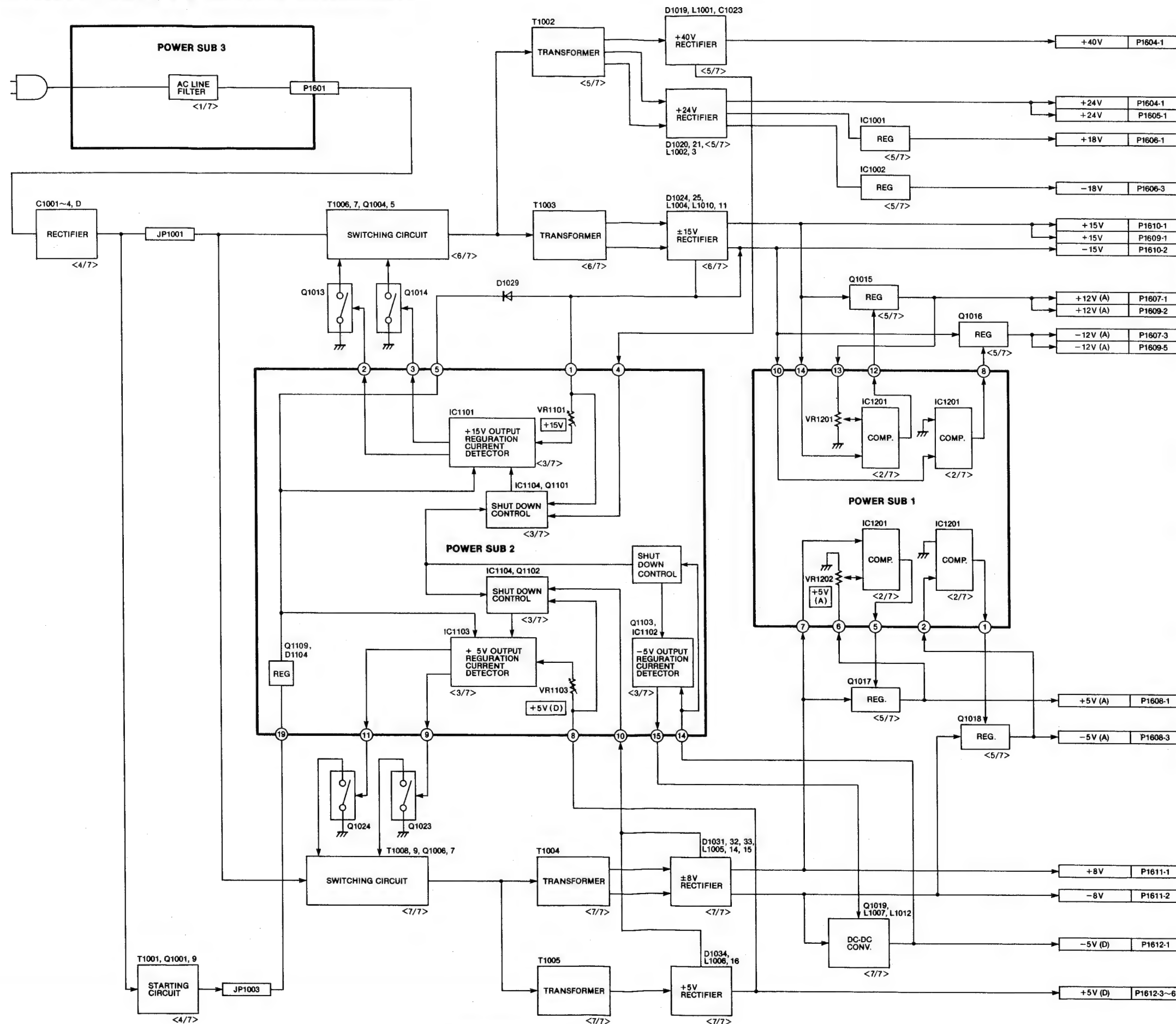
AUDIO OUT BLOCK DIAGRAM [FOR PAL]



AUDIO OUT BLOCK DIAGRAM [FOR NTSC]



POWER SUPPLY BLOCK DIAGRAM

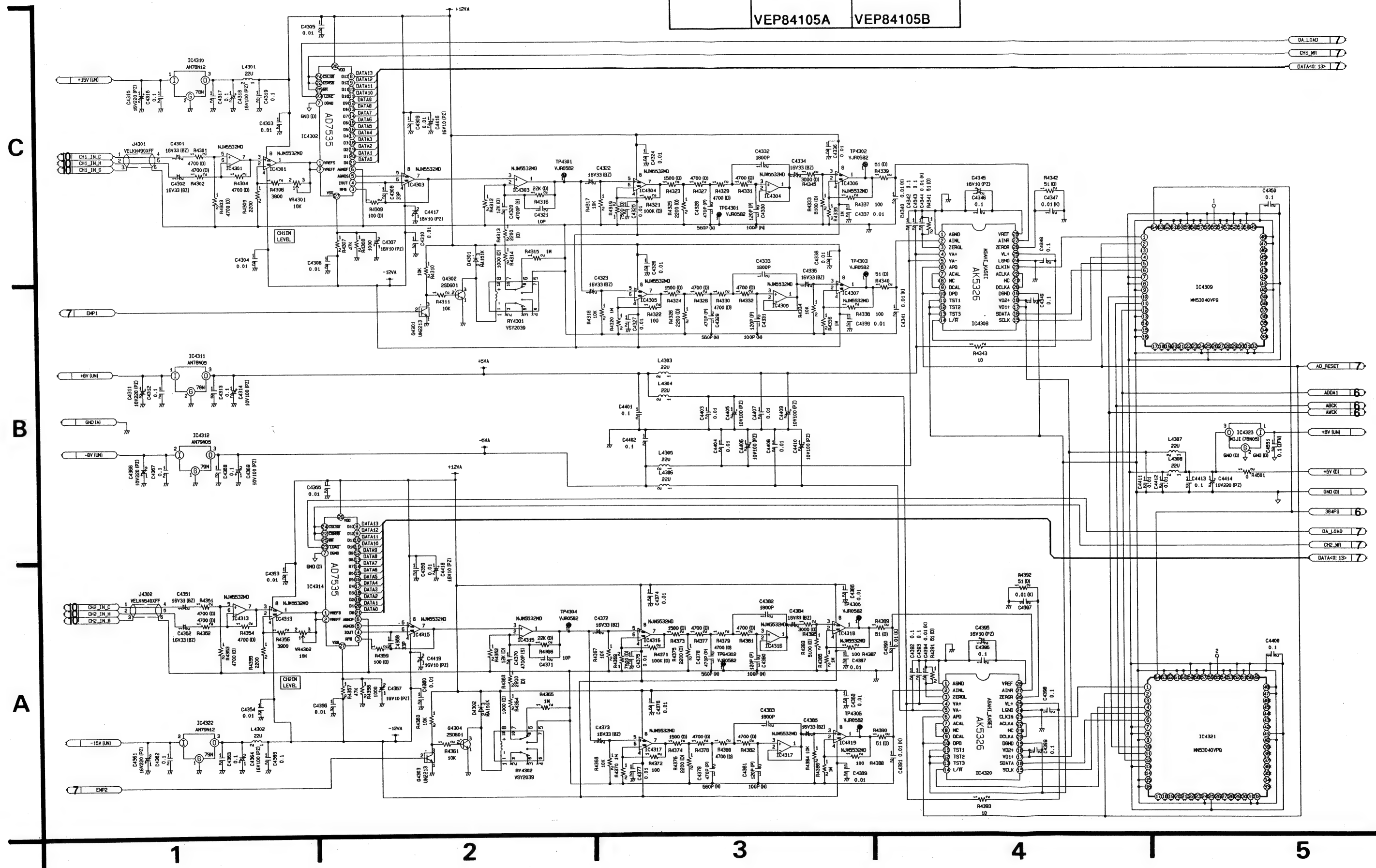


REVERSE SIDE
AUDIO OUT

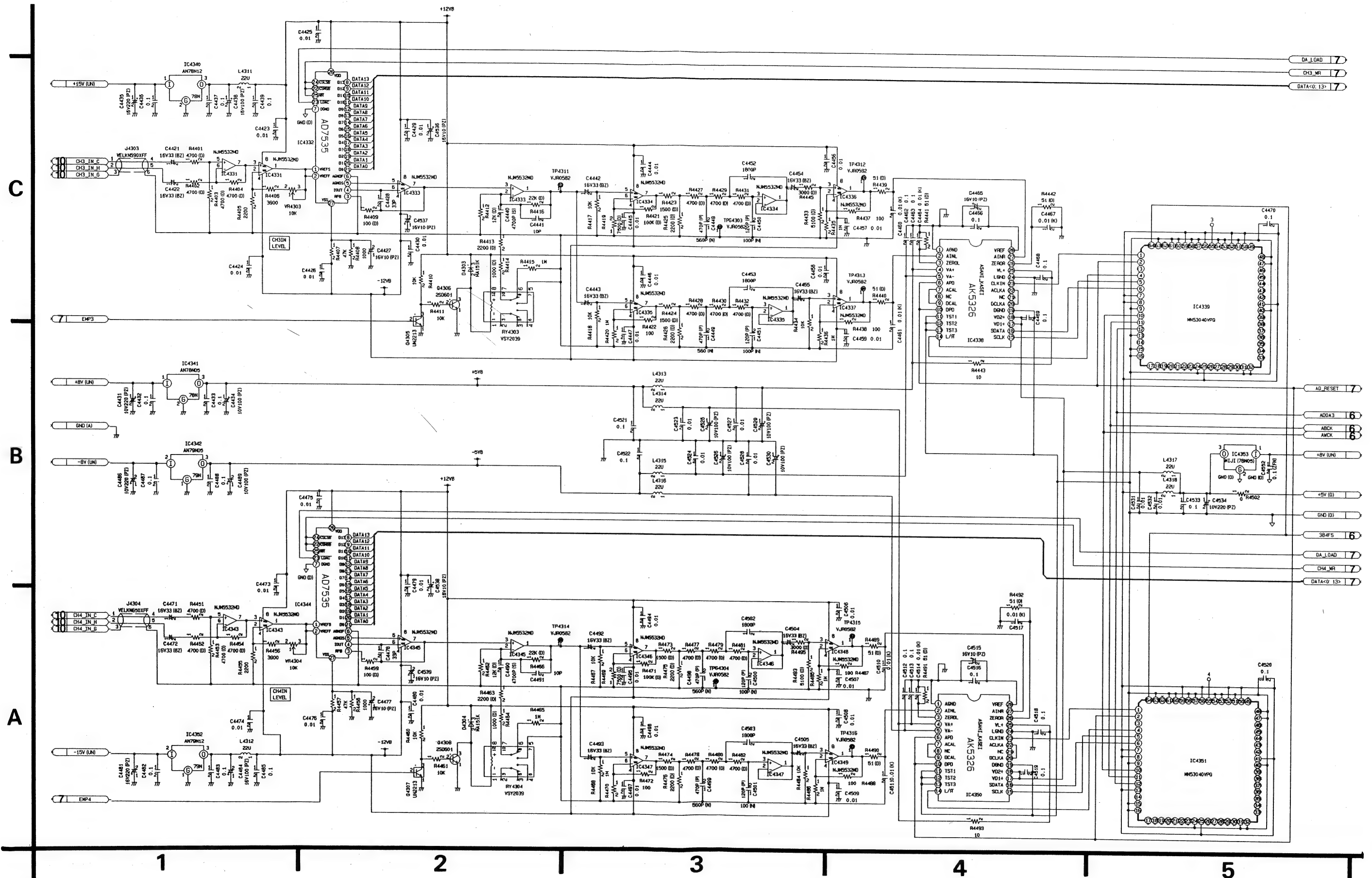
L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (1/10)

COMPARISON CHART BETWEEN
NTSC MODEL AND PAL MODEL
L1 AUDIO A/D D/A VIDEO D/A P.C.B.

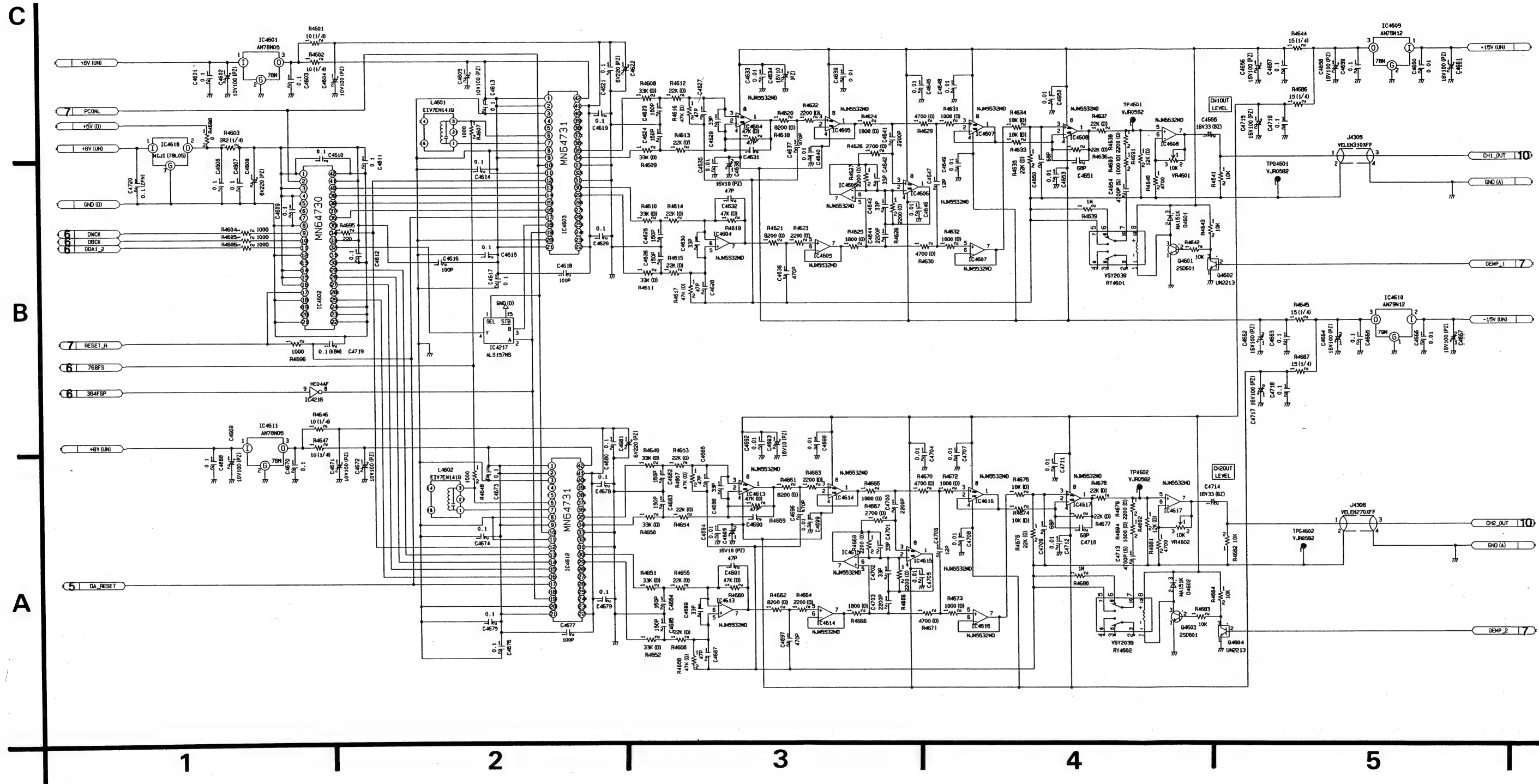
REF.NO.	NTSC	PAL
FL4001	VLF0902	VLF0904
	VEP84105A	VEP84105B



L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (2/10)



L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (3/10)

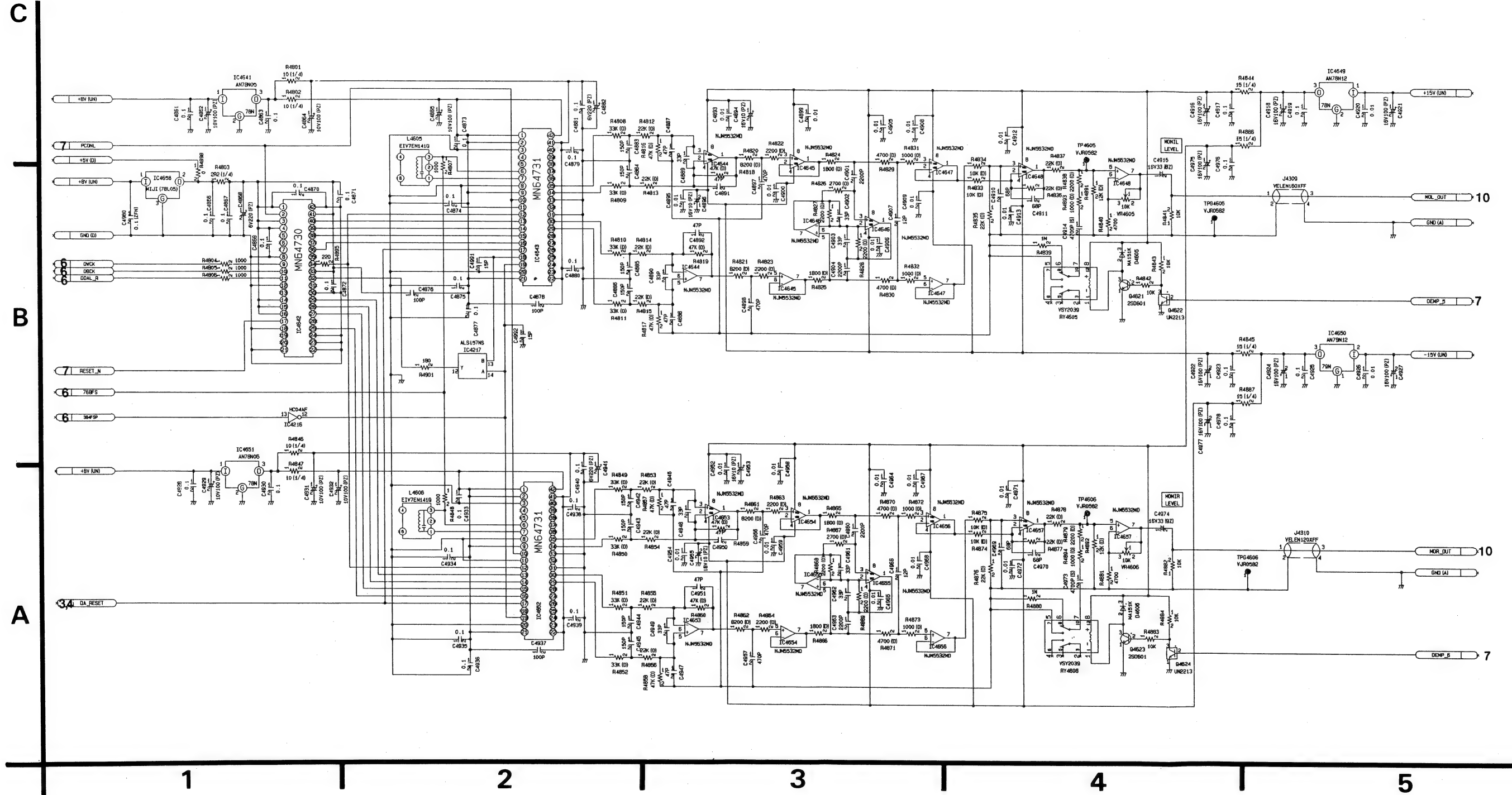


C



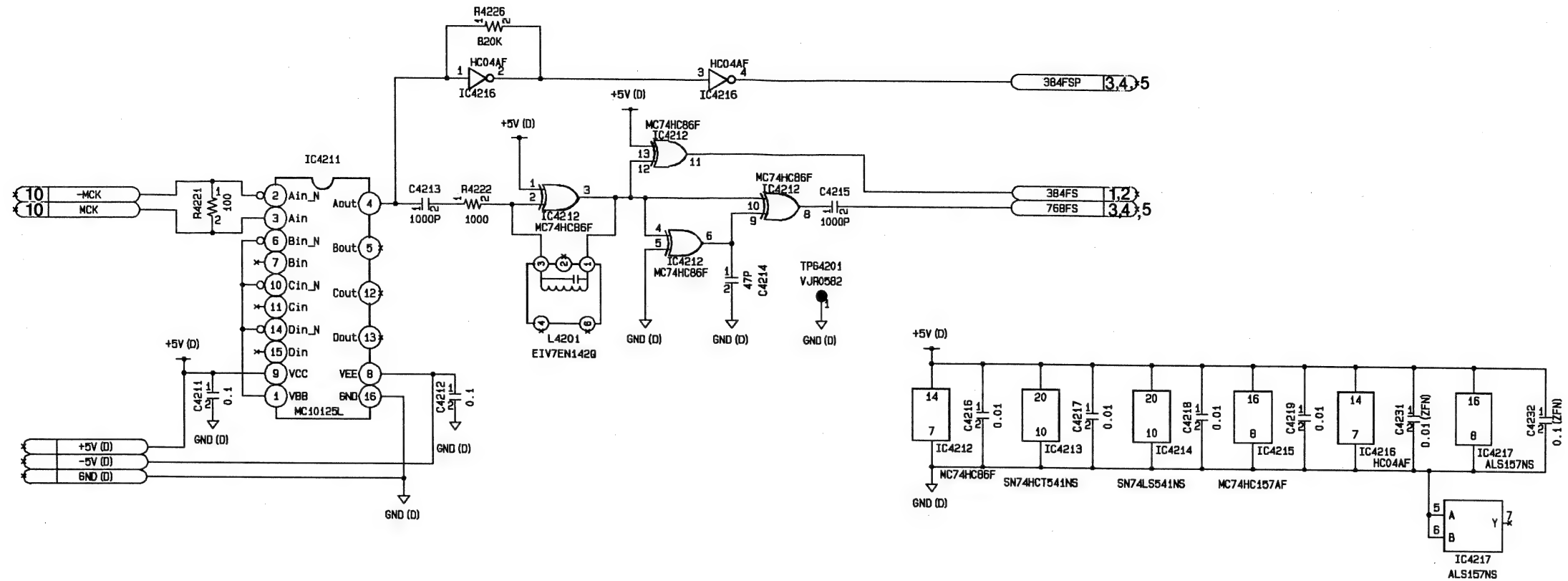
A

L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (5/10)

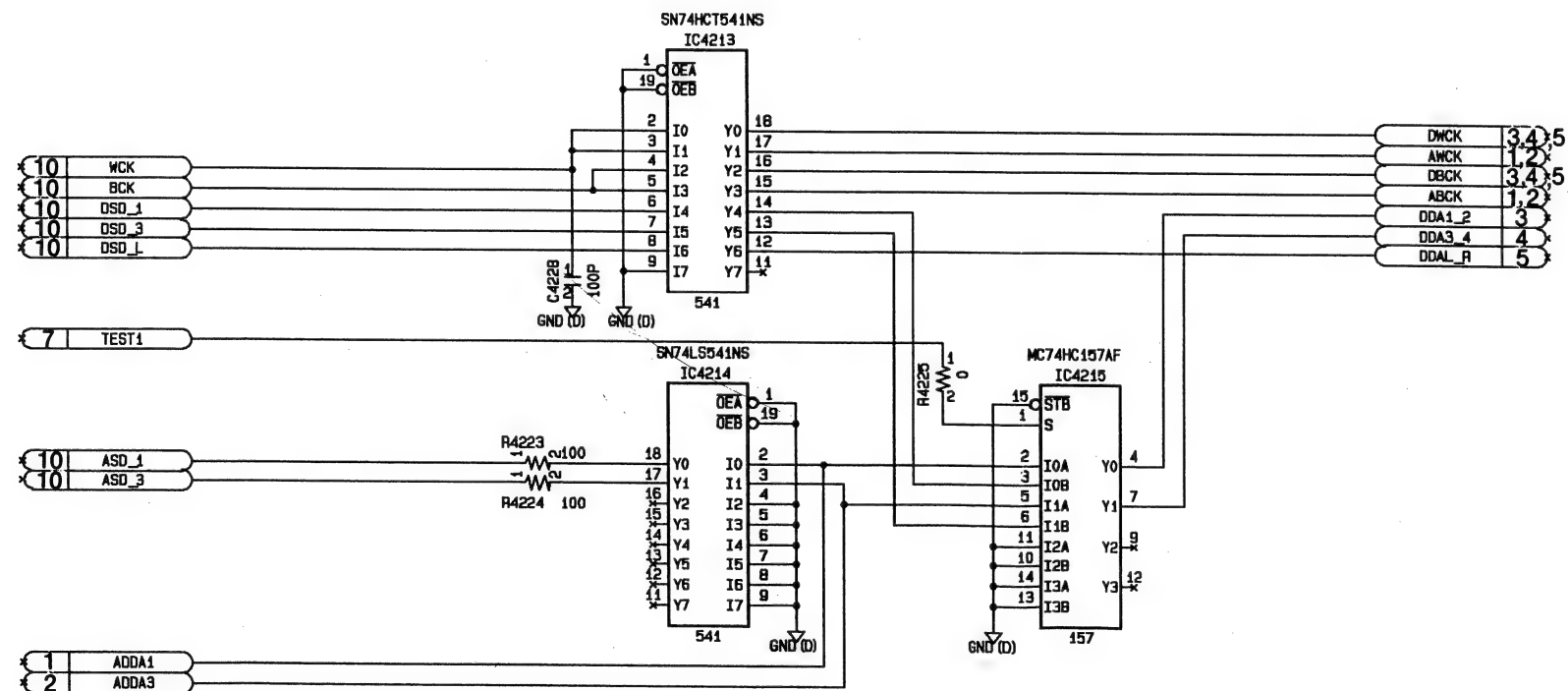


L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (6/10)

C



B



A

1

2

3

4

The schematic diagram illustrates a digital circuit for a 4-bit counter, organized into five vertical sections labeled 1 through 5 at the bottom. The circuit is powered by a +5V (D) supply and ground (GND (D)).

Section 1: Contains a 5V supply, ground, and a 10K resistor (R4201). It also includes a 4-bit counter output (DATA<0: 13>) and a 4-bit address output (AV_AD_0: 10).

Section 2: Features a 4-bit counter output (DATA<0: 13>) and a 4-bit address output (AV_AD_0: 10). It includes a 10K resistor (R4201) and a 10K resistor (R4202).

Section 3: Contains a 4-bit counter output (DATA<0: 13>) and a 4-bit address output (AV_AD_0: 10). It includes a 10K resistor (R4201) and a 10K resistor (R4202).

Section 4: Features a 4-bit counter output (DATA<0: 13>) and a 4-bit address output (AV_AD_0: 10). It includes a 10K resistor (R4201) and a 10K resistor (R4202).

Section 5: Contains a 4-bit counter output (DATA<0: 13>) and a 4-bit address output (AV_AD_0: 10). It includes a 10K resistor (R4201) and a 10K resistor (R4202).

Key Components and Connections:

- ICs:** MC74HC04AF (inverters), MC74HC139AF (4-to-16 decoder), MC74HC138AF (3-to-8 decoder), MC74HC123AF (monostable multivibrator), MC74HC32F (NAND gate), MC74HC573F (D-type flip-flop), and UPD710556 (4-bit counter).
- Resistors:** 10K (R4201, R4202, R4203, R4204, R4205, R4206, R4207, R4213, R4214), 100K (R4214), and 0.01 (C4201, C4202, C4203, C4204, C4205, C4206, C4207, C4208, C4209, C4210).
- Capacitors:** 0.01 (C4201, C4202, C4203, C4204, C4205, C4206, C4207, C4208, C4209, C4210).
- Control Signals:** CH4_WR, CH3_WR, CH2_WR, CH1_WR, AV_AB_B, AV_AB_9, AV_AB_10, AV_AB_11, AV_AB_12, AV_AB_13, AV_AB_14, AV_AB_15, WFM_2, WFM_1, WFM_0, PRE_MONI, DEMP_1, DEMP_2, DEMP_3, DEMP_4, DEMP_5, DEMP_6, RESET_N, AD_RESET, PCNL.

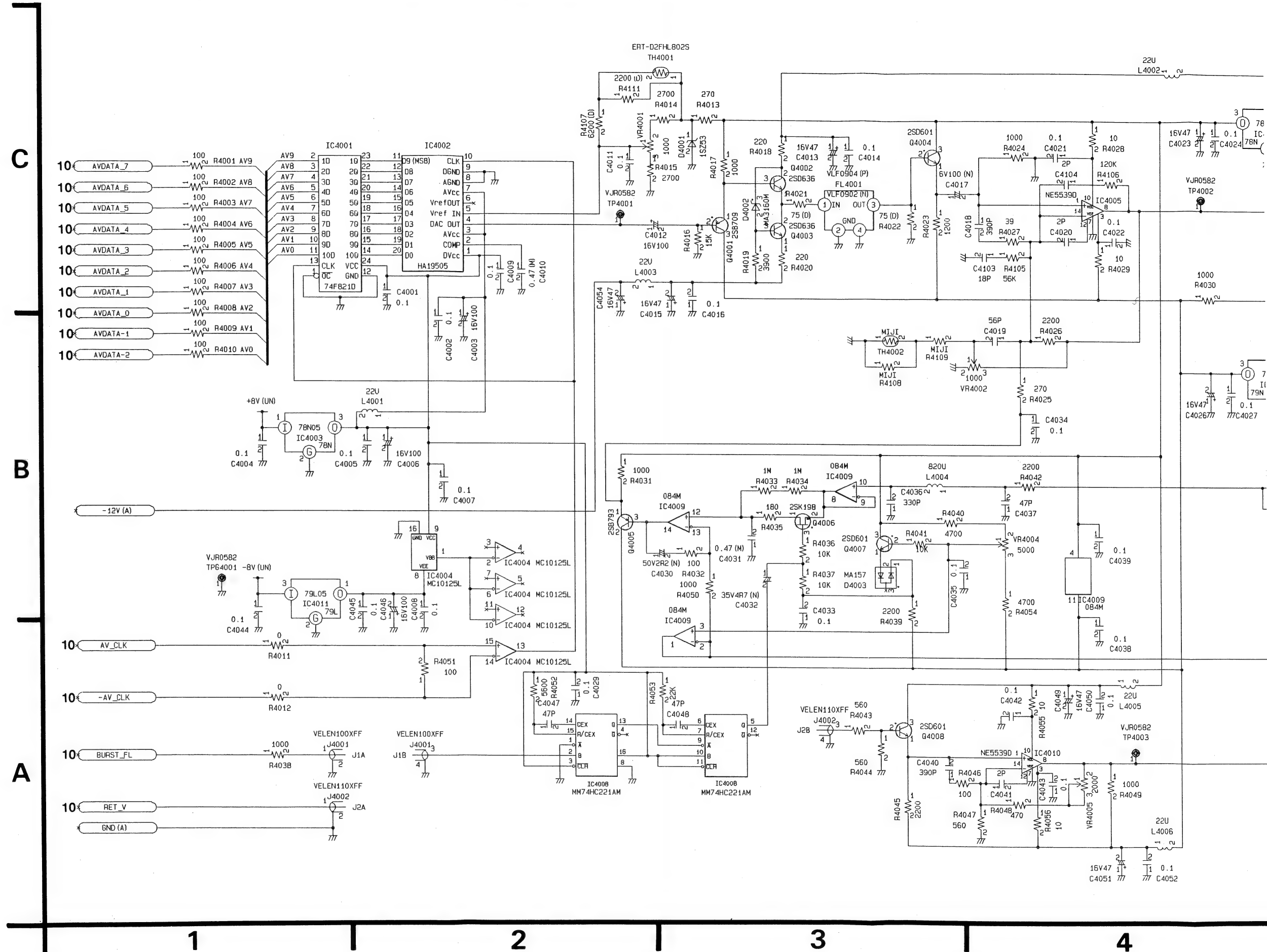
The circuit is designed to generate a 4-bit counter output (DATA<0: 13>) and a 4-bit address output (AV_AD_0: 10) based on the input signals and the internal logic of the ICs.

C



A

L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (9/10)



01
1
2
3
4
50
60
7
8
9
100
VCC
GND
10

1
105

C4045

X

X



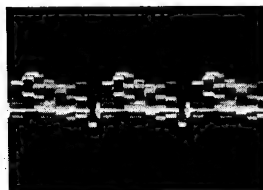
3

4

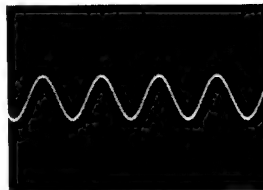
5

NTSC

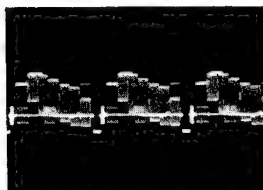
L1 WAVEFORMS NTSC



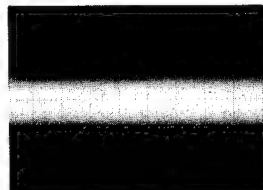
TP4001 E-E2
500mV/20 μ sec. div.



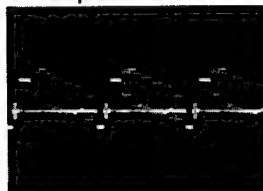
TP4304 E-E2
500mV/500 μ sec. div.



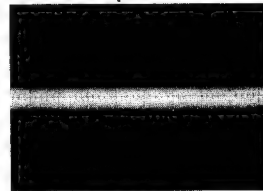
TP4002 E-E2
(TP4003, TP4004, TP4005,
TP4007)
1V/20 μ sec. div.



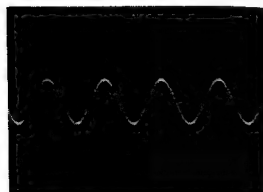
TP4311 E-E2
(TP4312, TP4313, TP4314,
TP4315, TP4316)
20mV/20 μ sec. div.



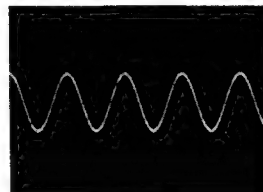
TP4006 E-E2
500mV/20 μ sec. div.



TP4603 E-E2
(TP4604)
20mV/500 μ sec. div.



TP4301 E-E2
500mV/500 μ sec. div.



TP4605 E-E2
(TP4606)
200mV/500 μ sec. div.



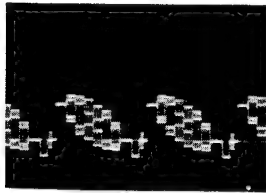
TP4302 E-E2
(TP4305)
2V/500 μ sec. div.



TP4303 E-E2
(TP4306, TP4601, TP4602)
200mV/500 μ sec. div.

PAL

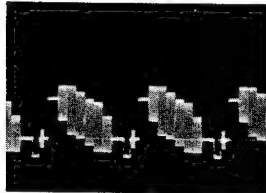
L1 WAVEFORMS PAL



TP4001 E-E2
500mV/20μsec. div.



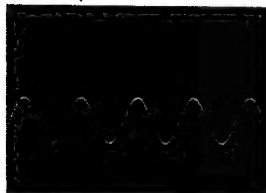
TP4311 E-E2
(TP4312, TP4313, TP4314,
TP4315, TP4316)
20mV/20μsec. div.



TP4002 E-E2
(TP4003, TP4004, TP4005,
TP4006, TP4007)
1V/20μsec. div.



TP4601 E-E2
(TP4602 – TP4606)
1V/500μsec. div.



TP4301 E-E2
(TP4304)
2V/500μsec. div.

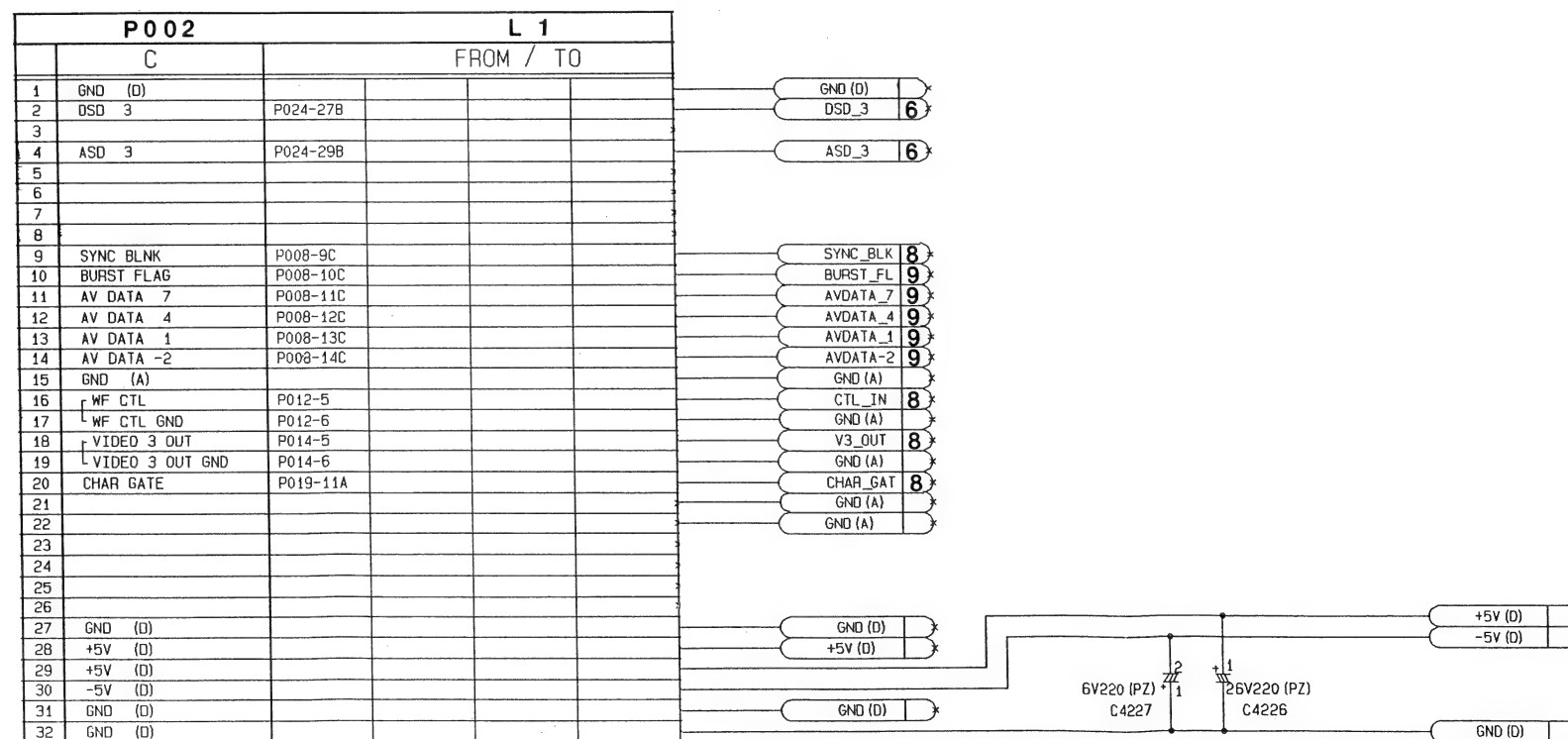
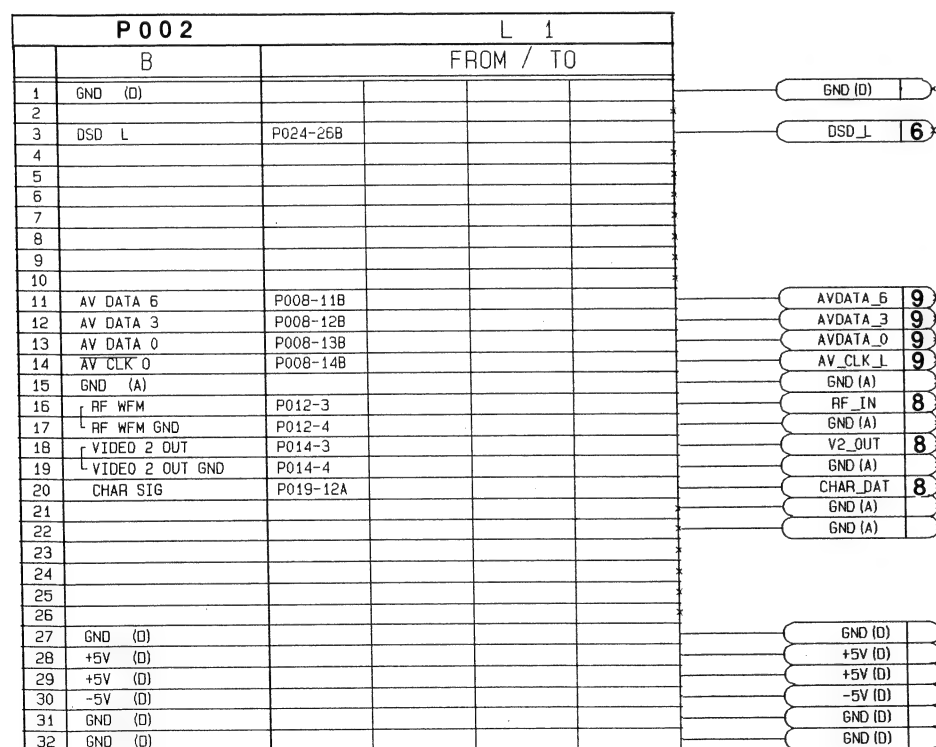
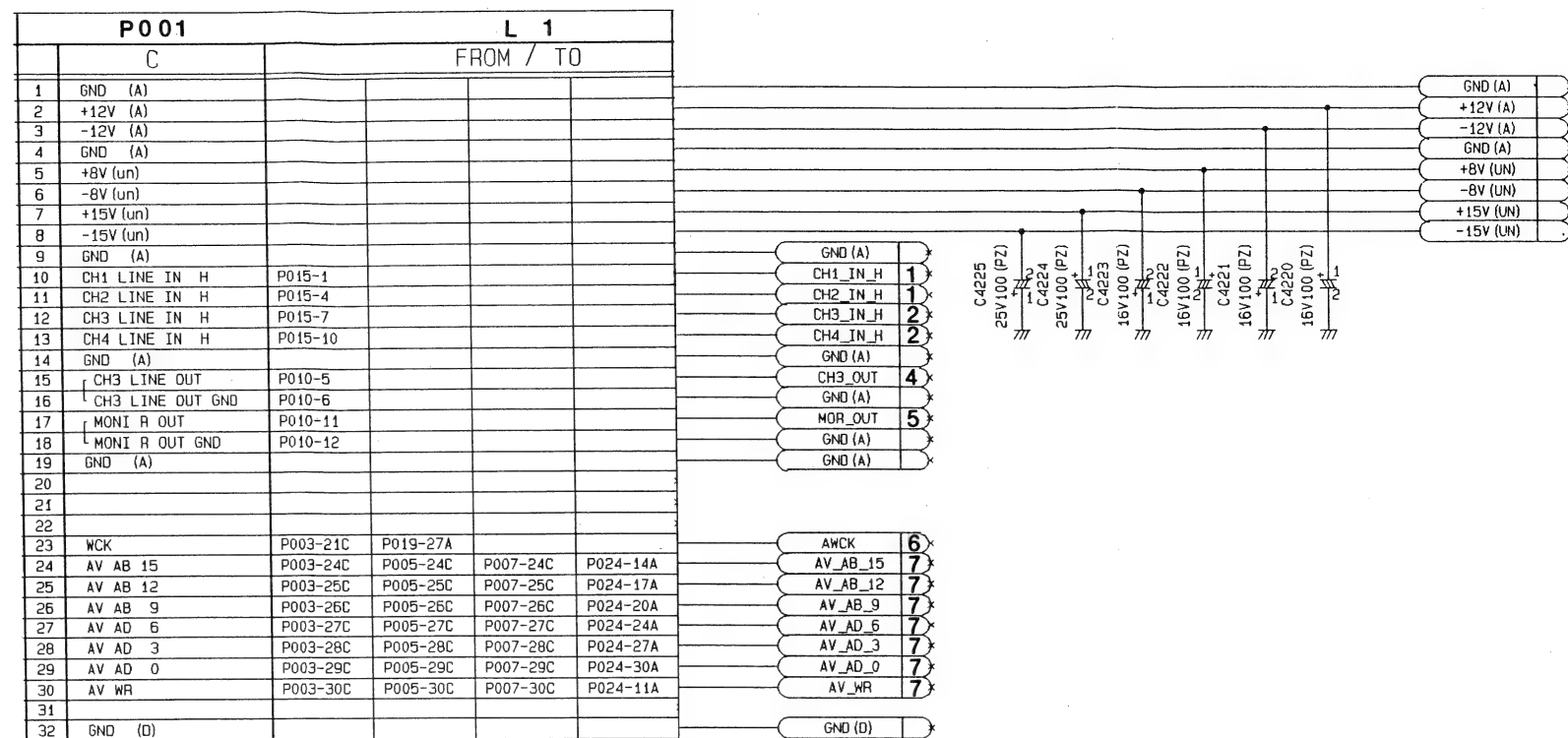
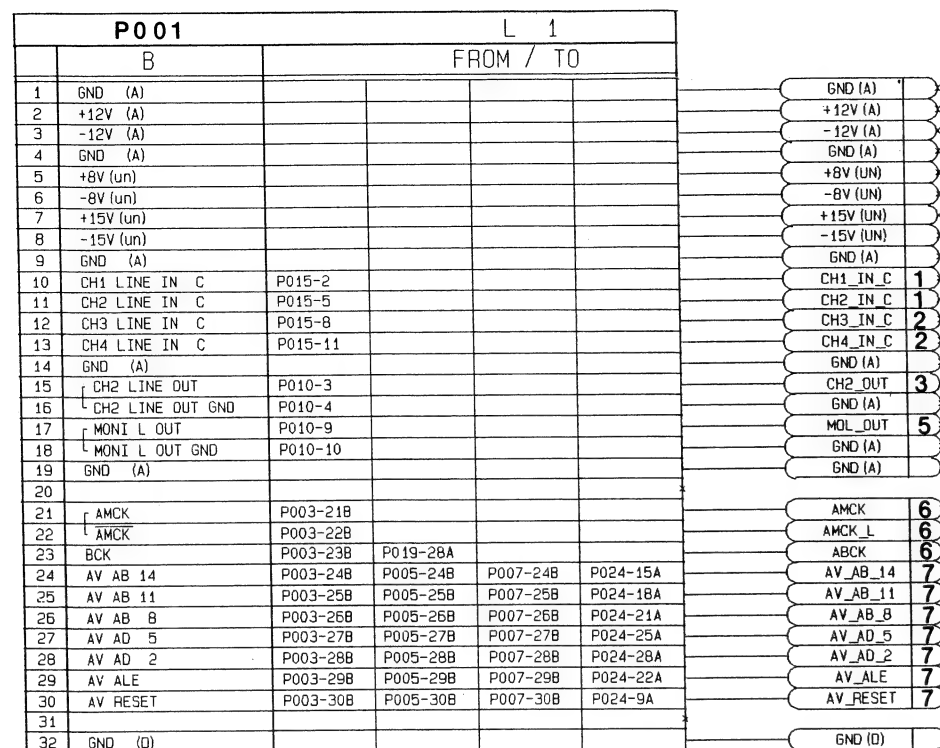


TP4302 E-E2
(TP4305)
5V/500μsec. div.



TP4303 E-E2
(TP4306)
1V/500μsec. div.

10/10) [L MOTHER (P001, P002) SCHEMATIC DIAGRAM (1/7) FOR L1]



3

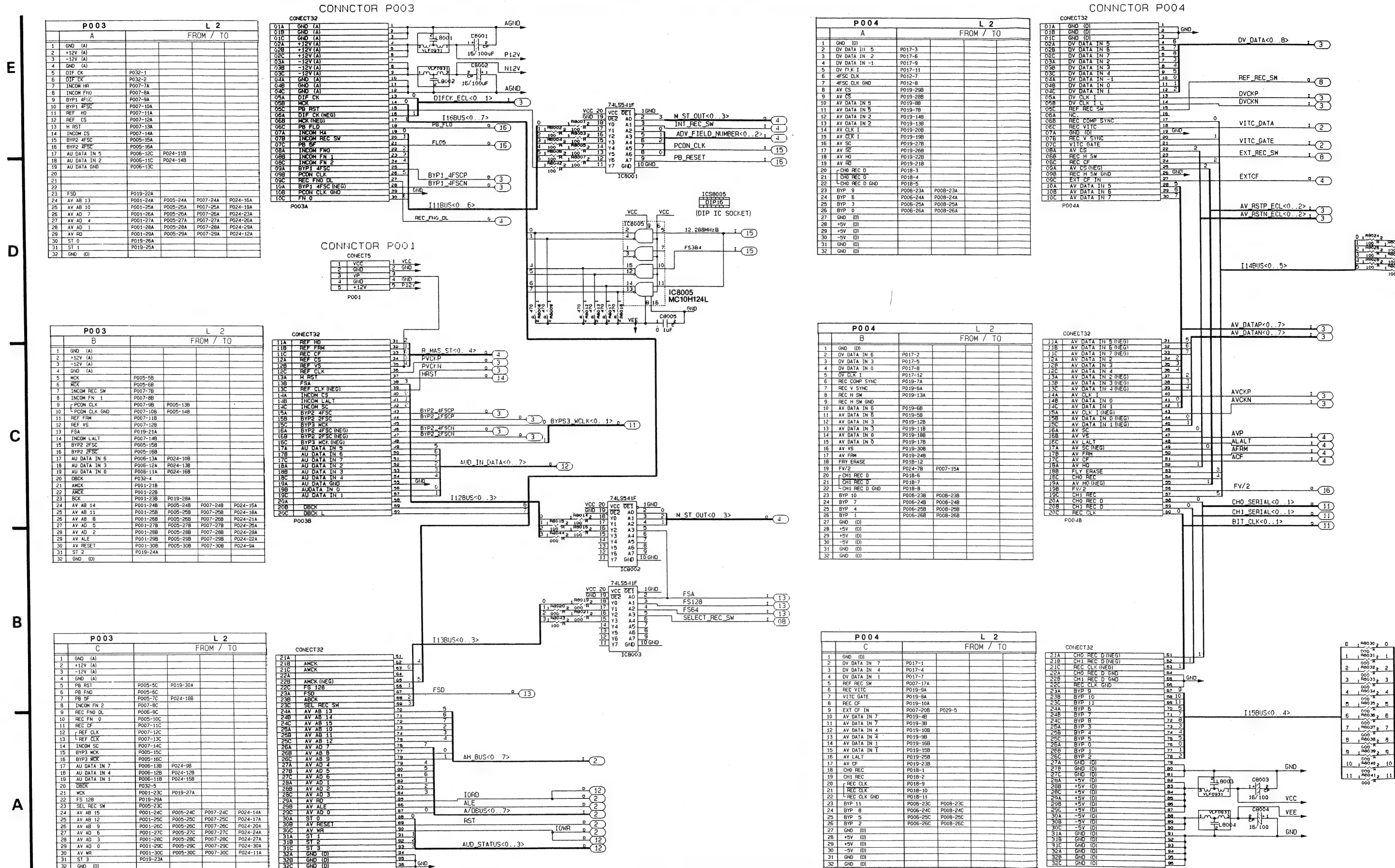
4

5

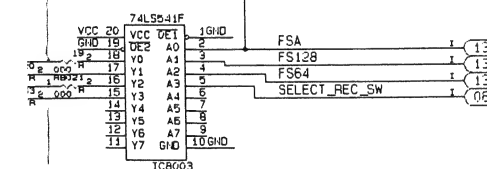
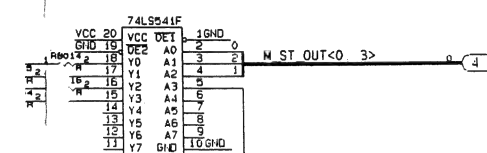
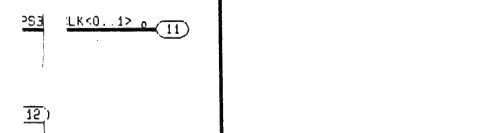
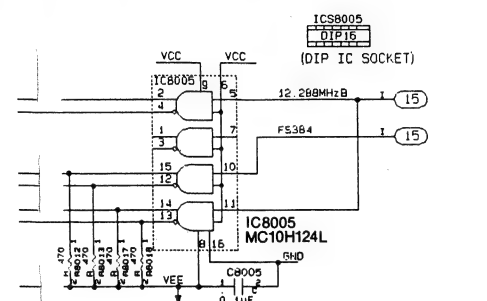
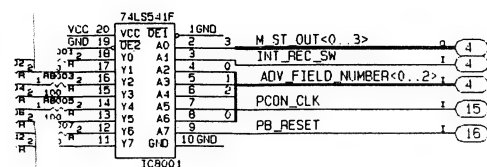
6

7

L2 VIDEO/AUDIO REC (CONNECTOR) SCHEMATIC DIAGRAM (1/19) [L MOTHER (P003, P004) SCHEMATIC DIAGRAM (2/7) FOR L2]



AGRAM (1/19) [L MOTHER (P003, P004) SCHEMATIC DIAGRAM (2/7) FOR L2]



P004		L 2	
A		FROM / TO	
1	GND (D)		
2	DV DATA IN 5	P017-3	
3	DV DATA IN 2	P017-6	
4	DV DATA IN -1	P017-9	
5	DV CLK 1	P017-11	
6	4FSC CLK	P012-7	
7	4FSC CLK GND	P012-8	
8	AV CS	P019-29B	
9	AV CS	P019-28B	
10	AV DATA IN 5	P019-8B	
11	AV DATA IN 5	P019-7B	
12	AV DATA IN 3	P019-14B	
13	AV DATA IN 2	P019-13B	
14	AV CLK 1	P019-26B	
15	AV CLK 1	P019-19B	
16	AV SC	P019-27B	
17	AV SC	P019-26B	
18	AV HD	P019-22B	
19	AV HD	P019-21B	
20	CH0 REC D	P018-3	
21	CH0 REC D	P018-4	
22	CH0 REC D GND	P018-5	
23	BYP 9	P006-23A	P008-23A
24	BYP 6	P006-24A	P008-24A
25	BYP 3	P006-26A	P008-26A
26	BYP 0	P006-26A	P008-26A
27	GND (D)		
28	+5V (D)		
29	+5V (D)		
30	-5V (D)		
31	GND (D)		
32	GND (D)		

P004		L 2	
B		FROM / TO	
1	GND (O)		
2	DV DATA IN 6	P017-2	
3	DV DATA IN 3	P017-5	
4	DV DATA IN 0	P017-8	
5	DV CLK	P017-12	
6	REC COMP SYNC	P019-7A	
7	REC V SYNC	P019-6A	
8	REC H SW	P019-13A	
9	REC H SW GND		
10	AV DATA IN 6	P019-6B	
11	AV DATA IN 6	P019-5B	
12	AV DATA IN 3	P019-2B	
13	AV DATA IN 3	P019-11B	
14	AV DATA IN 0	P019-18B	
15	AV DATA IN 0	P019-17B	
16	AV VS	P019-30B	
17	AV FRM	P019-24B	
18	FRM ERASE	P016-12	
19	FRZ	P004-7B	P007-15A
20	CH1 REC 0	P018-6	
21	CH1 REC 0	P018-7	
22	CH1 REC 0 GND	P018-8	
23	BYP 0	P006-23B	P008-23B
24	BYP 7	P006-24B	P008-24B
25	BYP 4	P006-25B	P008-25B
26	BYP 1	P006-26B	P008-26B
27	GND (O)		
28	+5V (O)		
29	+5V (O)		
30	-5V (O)		
31	GND (O)		
32	GND (O)		

P004		L 2	
C		FROM / TO	
1	GND (D)		
2	DV DATA IN 7	P017-1	
3	DV DATA IN 4	P017-4	
4	DV DATA IN 1	P017-7	
5	REF REC SW	P007-17A	
6	REC VITC	P019-9A	
7	VITC DATE	P019-8A	
8	REC CF	P019-10A	
9	EXT CF IN	P007-20B	P029-5
10	AV DATA IN 7	P019-4B	
11	AV DATA IN 7	P019-3B	
12	AV DATA IN 4	P019-10B	
13	AV DATA IN 4	P019-9B	
14	AV DATA IN 1	P019-16B	
15	AV DATA IN 1	P019-15B	
16	AV LALT	P019-25B	
17	AV CF	P019-23B	
18	CH REC	P018-1	
19	CH REC	P018-2	
20	REC CLK	P018-5	
21	REC CLK	P018-10	
22	REC CLK GND	P018-11	
23	BYP 11	P006-23C	P008-23C
24	BYP 8	P006-24C	P008-24C
25	BYP 5	P006-25C	P008-25C
26	BYP 2	P006-26C	P008-26C
27	GND (D)		
28	+5V (D)		
29	+5V (D)		
30	-5V (D)		
31	GND (D)		
32	GND (D)		

CONNECTOR P004

CONNECT32

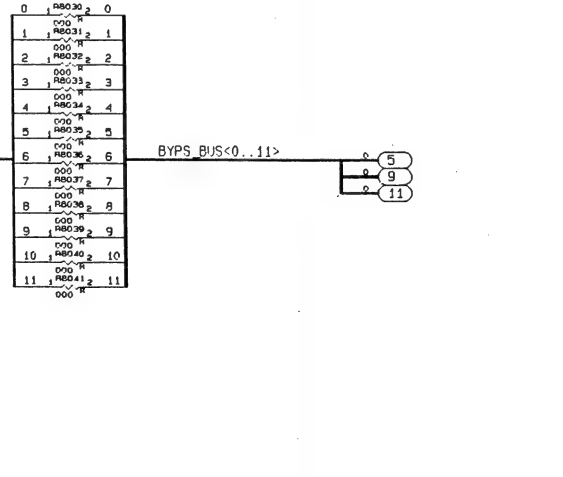
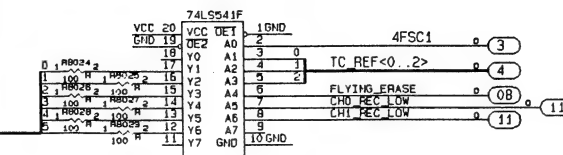
01A	GND (D)	1			
01B	GND (D)	2			
01C	GND (D)	3			
02A	DV DATA IN 5	4		DV_DATA<0..8>	1 3
02B	DV DATA IN 5	5			
02C	DV DATA IN 7	6			
03A	DV DATA IN 2	7			
03B	DV DATA IN 3	8			
03C	DV DATA IN 4	9			
04A	DV DATA IN -1	10		REF_REC_SW	0 8
04B	DV DATA IN 0	11			
04C	DV DATA IN 1	12			
05A	DV CLK I	13		DVCKP	1 3
05B	DV CLK LL	14		DVCKN	1 3
05C	REC REC SW	15			
06A	NC	16			
06B	REC COMP SYNC	17			
06C	REC VITC	18		VITC_DATA	1 2
07A	GND (D)	19			
07B	REC V SYNC	20			
07C	VITC GATE	21		VITC_GATE	1 2
08A	AV CS	22			
08B	REC H SW	23		EXT_REC_SW	1 8
08C	REC CF	24			
09A	AV CS (NEG)	25			
09B	REC H SW GND	26			
09C	EXT CF IN	27		EXTCF	0 4
10A	AV DATA IN 5	28			
10B	AV DATA IN 6	29			
10C	AV DATA IN 7	30			

P004

AV DETP EN<0..2>

CONECT32		AV_DATA<0..7>		3
11A	AV DATA IN 5 (REG)	21	5	3
11B	AV DATA IN 6 (REG)	22	6	3
11C	AV DATA IN 7 (REG)	23	7	3
12A	AV DATA IN 2	24	2	3
12B	AV DATA IN 3	25	3	3
12C	AV DATA IN 4	26	4	3
13A	AV DATA IN 2 (REG)	27	2	3
13B	AV DATA IN 3 (REG)	28	3	3
13C	AV DATA IN 4 (REG)	29	4	3
14A	AV CLK 1	40	0	3
14B	AV DATA IN 0	41	1	3
14C	AV DATA IN 1	42	2	3
15A	AV CLK 1 (REG)	43	3	3
15B	AV DATA IN 0 (REG)	44	0	3
15C	AV DATA IN 1 (REG)	45	1	3
16A	AV SC	46	6	3
16B	AV VS	47	7	3
16C	AV LAL1	48	8	3
17A	AV SC (REG)	49	9	3
17B	AV FRM	50	0	3
17C	AV CF	51	1	3
18A	AV HO	52	2	3
18B	FLY ERASE	53	3	3
18C	CHO REC	54	4	3
19A	AV HO (REG)	55	5	3
19B	CHO REC 1	56	6	3
19C	CHO REC 2	57	7	3
20A	CHO REC D	58	8	3
20B	CHO REC U	59	9	3
20C	CHO REC CLR	60	0	3
P00B0		AVCKP		1
		AVCKN		3
		AVP		4
		ALALT		4
		AFRM		4
		ACF		4
		FV/2		0
		CHO SERIAL<0..1>		0
		CH1 SERIAL<0..1>		0
		BIT CLK<0..1>		0

CONNECT32			
21A	CH0 REC D (NEG)	61	1
21B	CH1 REC D (NEG)	62	1
21C	REC CLK (NEG)	63	
22A	CH0 REC D GND	64	
22B	CH1 REC D GND	65	GND
22C	REC CLK GND	66	
23A	BYP 5	67	0
23B	BYP 10	68	10
23C	BYP 11	69	11
24A	BYP 6	70	6
24B	BYP 7	71	7
24C	BYP 8	72	8
25A	BYP 3	73	3
25B	BYP 4	74	4
25C	BYP 5	75	5
26A	BYP 0	76	0
26B	BYP 1	77	1
26C	BYP 2	78	2
27A	GND (I)	79	
27B	GND (I)	80	
27C	GND (I)	81	
28A	+5V (I)	82	
28B	+5V (I)	83	
28C	+5V (I)	84	
29A	+5V (I)	85	
29B	+5V (I)	86	
29C	+5V (I)	87	
30A	-5V (I)	88	
30B	-5V (I)	89	
30C	-5V (I)	90	
31A	GND (I)	91	
31B	GND (I)	92	
31C	GND (I)	93	
32A	GND (I)	94	
32B	GND (I)	95	
32C	GND (I)	96	



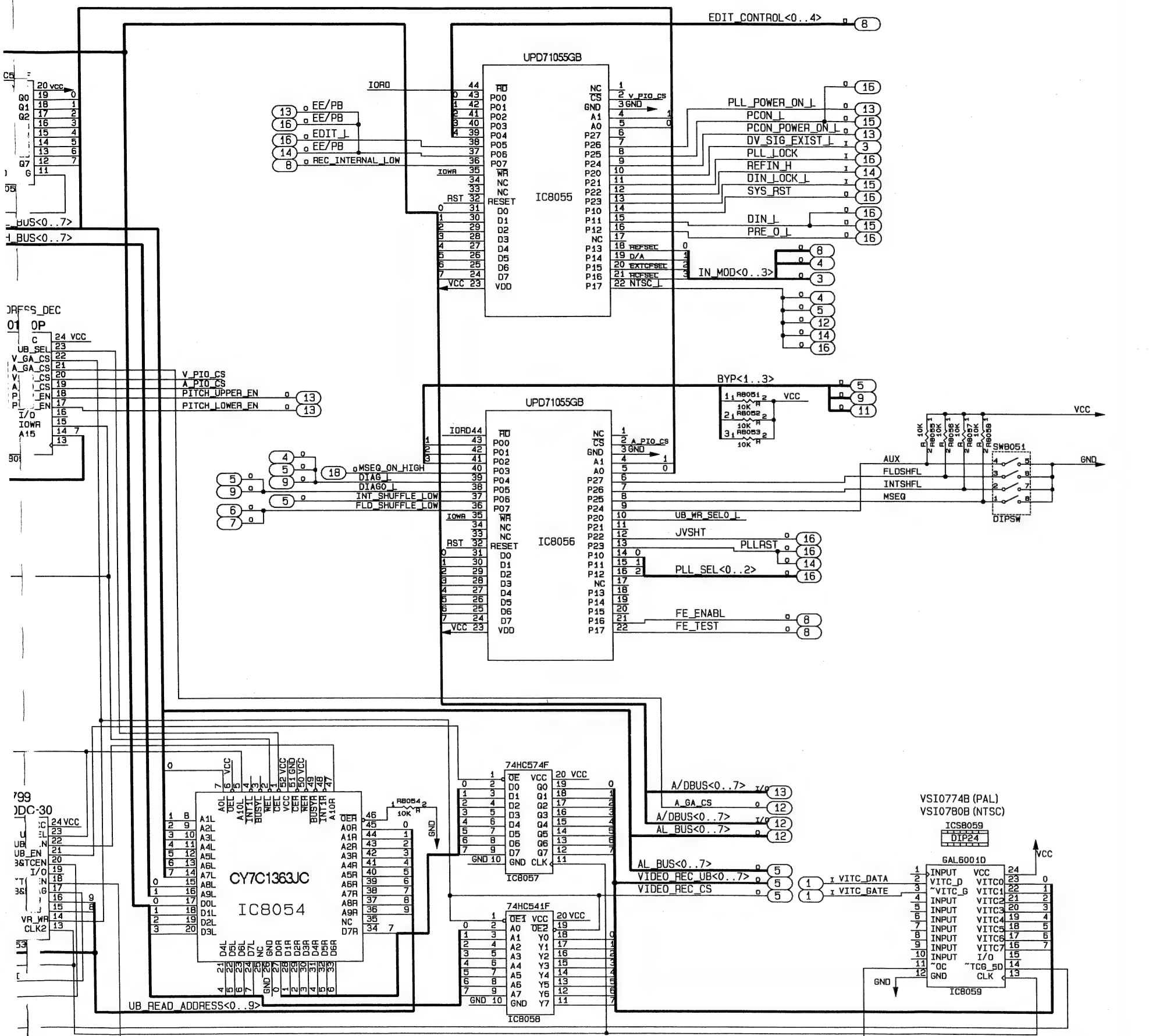
COMPARISON CHART BETWEEN
NTSC MODEL AND PAL MODEL
L2 VIDEO/AUDIO REC P.C.B.

REF. NO.	NTSC	PAL
IC8059	VS10780B	VS10774B
IC8114	VS10951B	VS10950B
IC8152	VS10953	VS10952B
IC8154	VS10797	VS10796A
IC8351	VS10775B	VS10769B
IC8352	VS10792	VS10790
IC8353	VS10791	VS10789
IC8357	VS10777B	VS10771B
IC8358	VS10776B	VS10770B
IC8360	VS10778B	VS10772B
IC8362	VS10778B	VS10772B
IC8503	VS10779B	VS10773B
IC8509	VSX0468	VSX0467
IC8751	VS10934B	VS10933A
IC8752	VS10936A	VS10935A
IC8753	VS10938D	VS10937D
	VEP88072C	VEP88072D

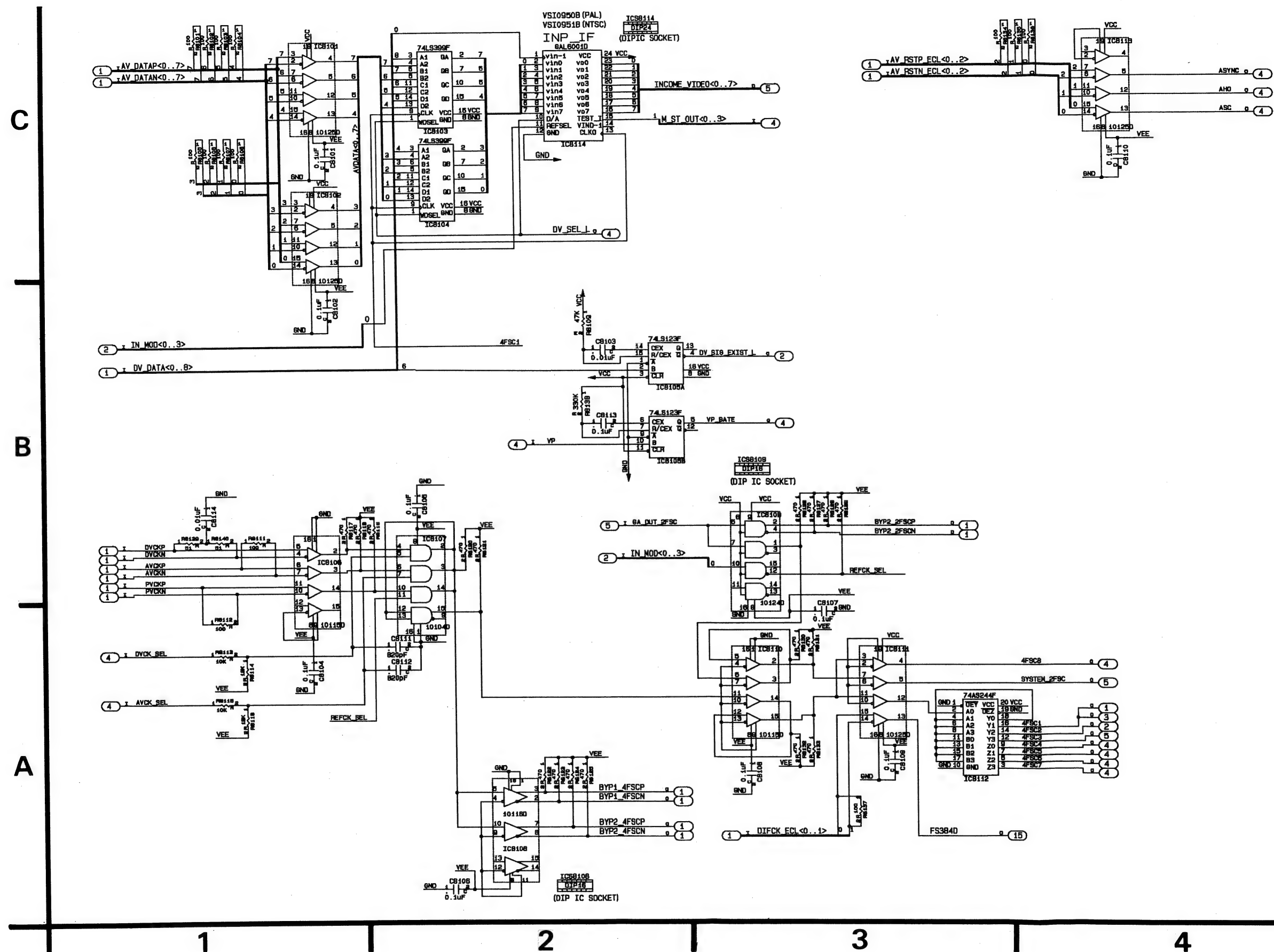
A vertical scale with three horizontal tick marks. The bottom tick mark is labeled 'A', the middle tick mark is labeled 'B', and the top tick mark is labeled 'C'.



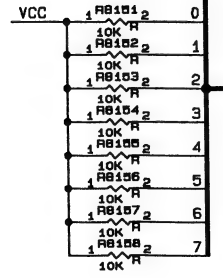
(SYS IF) SCHEMATIC DIAGRAM (2/19)



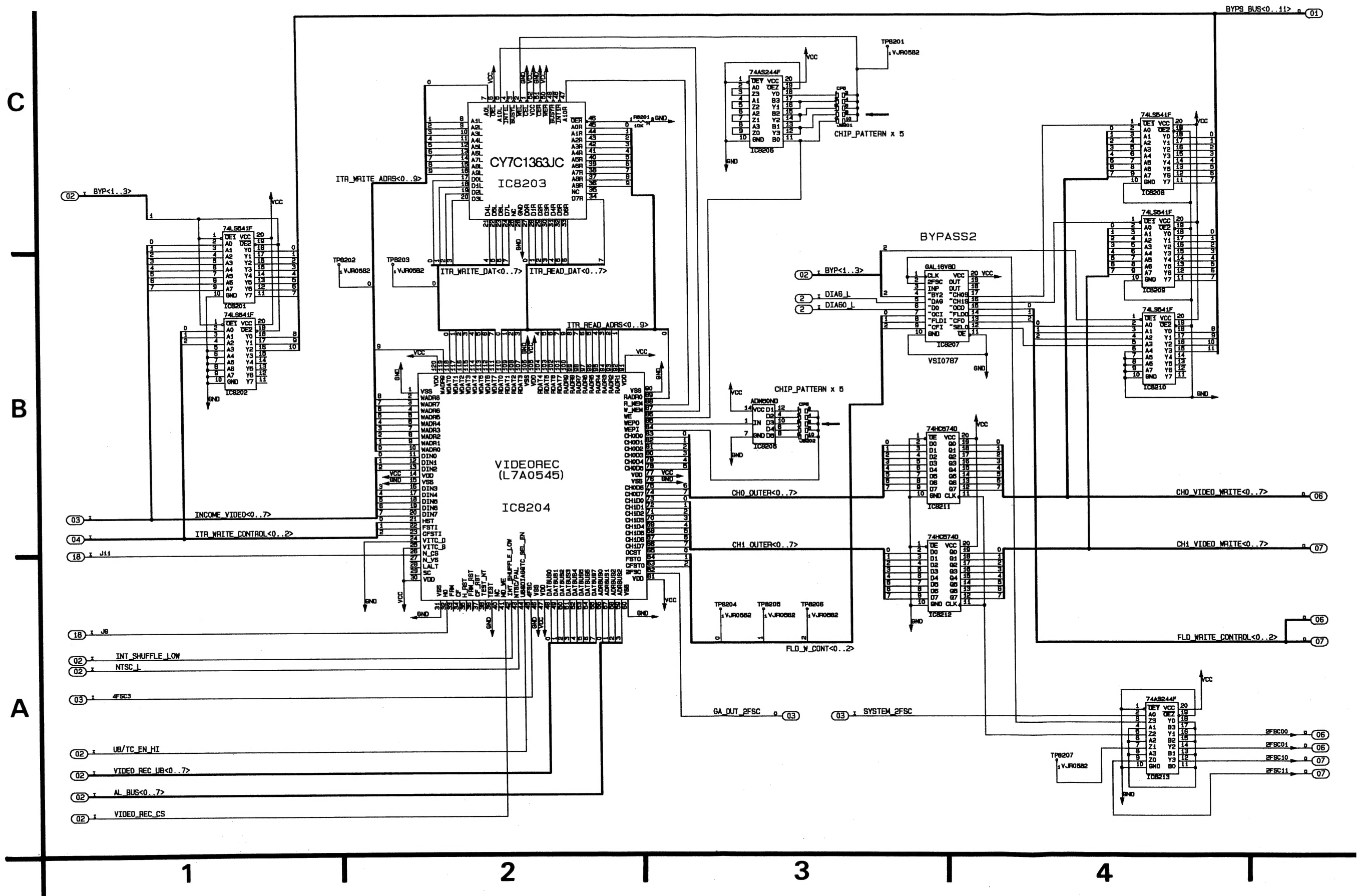
L2 VIDEO/AUDIO REC (INPUT IF) SCHEMATIC DIAGRAM (3/19)



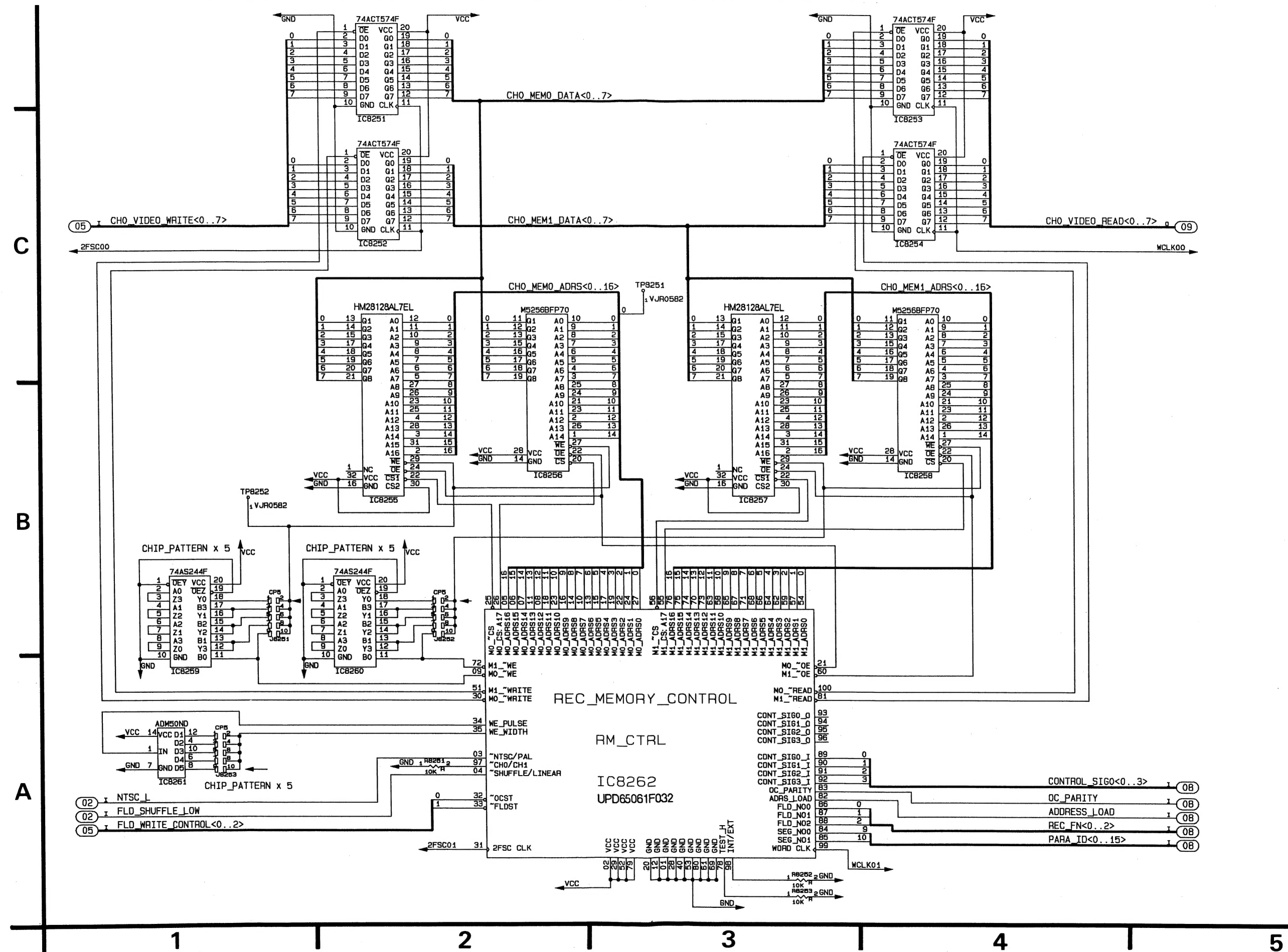
A B C



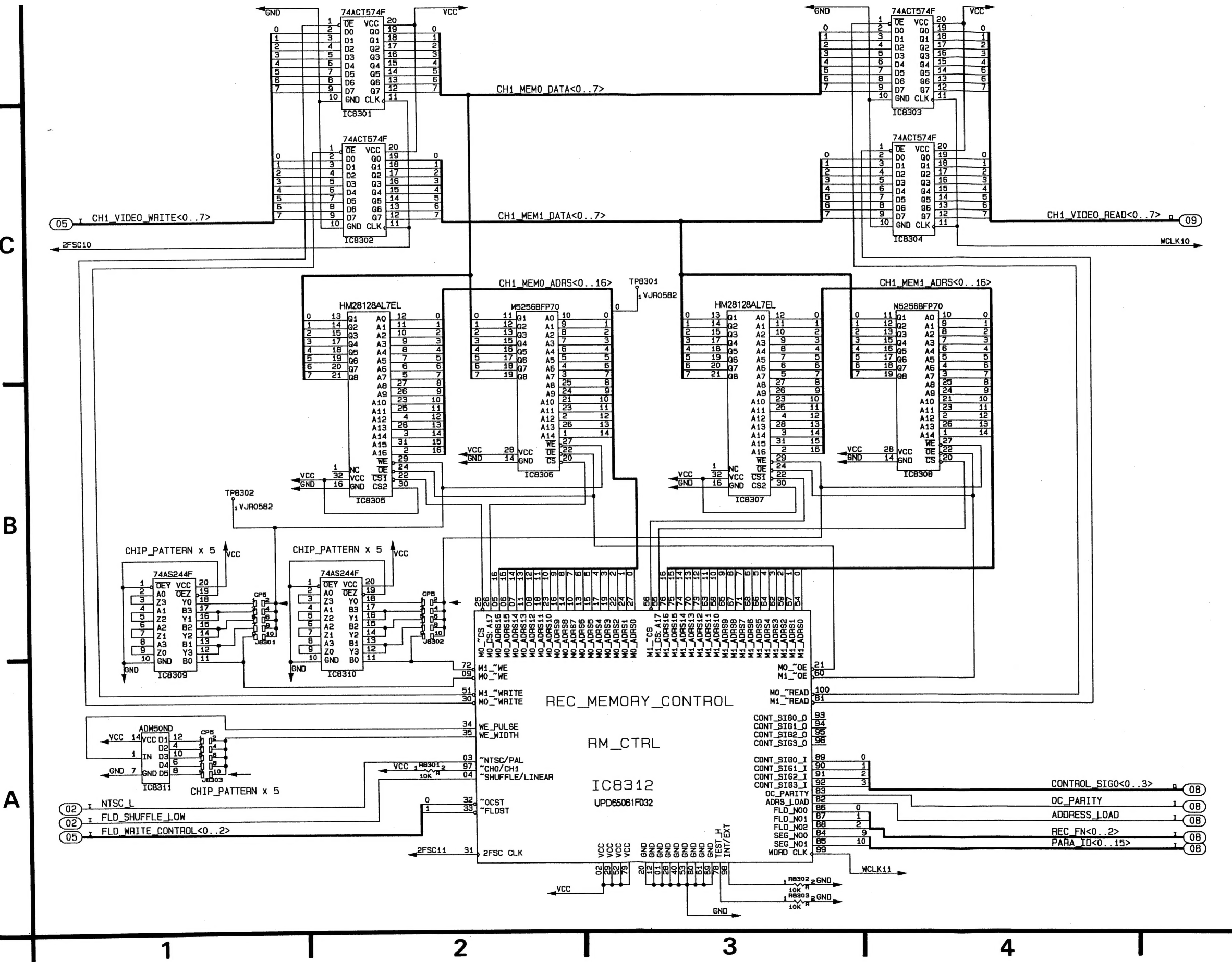
L2 VIDEO/AUDIO REC (INTRA-SHUFFLE & OUTER ENCODE) SCHEMATIC DIAGRAM (5/19)



L2 VIDEO/AUDIO REC (CH0 SHUFFLING MEMORY) SCHEMATIC DIAGRAM (6/19)



L2 VIDEO/AUDIO REC (CH1 SHUFFLING MEMORY) SCHEMATIC DIAGRAM (7/19)



L2 VIDEO/AUDIO REC (CHANNEL CONTROL & ID GEN) SCHEMATIC DIAGRAM (8/19)

